The Builder.

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The House of Lords on Architecture.

LAST week the House of Lords indulged in one of those field-days of architectural criticism with which both legislative bodies occasionally vary the monotony of business, and afford a certain amount of edification to the architectural world. In the House of Commons, it is true, the argument usually turns chiefly on what a building has cost or may cost, or how it might be done cheaper. The general tone of such discussions in the House of Lords is higher than that, and there is usually evidence of some perception of the value of architecture for its own sake; nor was such evidence wanting on the occasion referred to. But the debate, the principal part of it at least, furnished one more example of the confusion of mind under which most political men seem to be as to the meaning and objects of architecture, and of the absurdly illogical side issues which are raised in such discussions.

The subjects discussed were three, or rather they came under three heads, for there were in reality four points under discussion, viz.: the widening of Parliament-street; the site for the National Portrait Gallery; the Constitution-hill arch; and Westminster Hall. Of these, the *Times* characteristically says, "two are of real interest"; these of course being the questions of widening Parliament-street and of preserving an open space next to the Portrait Gallery; such subjects as the architectural treatment of Westminster Hall and of the Constitution-hill arch being, in the eyes of the *Times*, of no "real interest": an amusing example of the faithful manner in which the leading journal reflects the opinions of the average British Philistine. The advantage of widening a street is a matter that the average Englishman can appreciate; the blunder of maltreating a great building, in an architectural sense, is one to which he is entirely indifferent

We may quite concur, however, in the positive statement that the Parliament-street question is of real interest, without admitting its supposed complementary negative; and Lord Lamington, who does good service to the country in keeping an eye on questions relating to public improvement, was opportune in calling attention to a delay in a long-promised work which appears anything but creditable. The Government, however, has placed itself in the power of a private company to some extent in this matter, putting the work into the hands of the said company, while imposing on it the restriction that 500,000*l.* Ordinary Stock must be subscribed for before they could pull down a house. Whether such an important public improvement ought to have been left in the hands of a private company is, as Lord Henniker implied, a point rather too large to be discussed as supplementary to the main question why the work had not been taken in hand; though we entirely concur in what we suspect was his unexpressed opinion, that it ought not to have been so left, and that it is a weak and sidelong manner of getting such an important public improvement carried out. As, however, the Government have by this process tied their own hands as well as those of the "private company" referred to, we have only to compose our patience to wait till the money is raised.

In the discussion as to the purchase of the plot of land immediately north of the proposed site of the National Portrait Gallery, in order to secure an open space adjoining the Gallery both for light and security, Lord Rosebery, speaking as Chairman of the London County Council, was undoubtedly in the right in his position, that the Council would not be justified in giving, for a national purpose, a site which constituted part of the municipal property for the management of which they are responsible to the ratepayers. This view of the matter is still further enforced when we consider that the Government have had the cost of building the Gallery taken off their hands by private munificence, and that, as Lord Rosebery put it, having had 100,000*l.* given them for a building which they ought to have carried out themselves, they might certainly "screw up their courage" to find 7,000*l.* for preserving the site from encroachment by other buildings. Lord Hardinge went so far as to hint that, if they refused to do this, "it was possible the anonymous donor might cry off." The unknown, we are inclined to believe, is too public-spirited a person to take such a course, but the Government will present a very shabby figure if it refuses the money, considering that, as to the importance of preserving the space intact, both on architectural and practical grounds, there can be no doubt whatever.

We now come to the portion of the debate touching on purely architectural questions, which, if of "no real interest," is certainly amusing. Earl Wemyss, who has some ideas on things architectural, hoped in the first place that as the approaches to Constitution-hill from Hyde Park-corner were about to be altered, the Government would cause them to be so formed as to admit of the levelling of the base of the arch at the entrance to the drive, "which, since its removal to its present site, enjoyed the unique privilege among similar structures of having one side considerably shorter than the other, consequent upon its being built upon a slope." It might be possible in this way to render the position of the arch a little less absurd in regard to detail, but that can hardly disguise the fact that the arch is on the side of a declivity, that it faces nowhere and is central to nothing. These things should have been thought of before it was done; it is too late now. And are we, after such a piece of blundering, to have further modifications of laying-out, under the auspicious direction of the Office of Works, with no higher mind to oversee them? If so, there will be more blundering; to be again perceived and pointed out when it is too late.

Then Earl Wemyss proceeded to the Westminster Hall business, and his speech would certainly be a noteworthy justification to us for indulging in that rather disagreeable form of retort which is summed up in the expression, "I told you so!" Long before anything was done, we said that when it was discovered what the result of this treatment was on the interior of the Hall, there would be a storm of indignation. Is it not so? Earl Wemyss proceeded to sum up all that had been said "in another place" about it, and to point out that, with the exception of Mr. Shaw-Lefevre (the principal instigator in the transaction) and the Commissioner of Works (the responsible official), not a Member of Parliament had a word to say in defence of the result. Earl Wemyss added a graphic statement of his own feelings on the matter:—

> "There was a hoarding which long concealed the whole thing from the public. When he first beheld the staircases he was flabbergasted at what he saw, and there being nobody else to whom he could express his feelings, he could not resist saying to the policeman as he went through St. Stephen's Hall, 'I don't think the Fenians could have done worse.' The policeman replied, 'I don't think they could.'"

But why did not Earl Wemyss and others, who now profess such interest and indignation, why did they not go behind the hoard-

ings and find out what was being done before it was too late? As members of one or the other House they would have had no difficulty in doing so. They could have had plenty of information about what the result would be, if they had looked for it where they might be sure to find it. But the fact is that though noble lords and honourable members can make indignant speeches about matters of this kind after the event, not one of them really cares enough about architecture to take the trouble to find out what is going on, and endeavour to prevent a blunder before it is too late. And how much knowledge of what architecture means Earl Wemyss really possesses is shown in his proceeding solemnly to read a letter on the subject from Lord Grimthorpe, as "a member of their Lordship's house who was a great authority on architecture, especially on Gothic architecture." How long is this farce to go on? There is no ground whatever for quoting Lord Grimthorpe as "an authority on Gothic architecture," except his own statements in his ridiculous and bragging letters in the *Times*, and his spiteful abuse and depreciation of architects for some reasons best known to himself. It is really inexplicable that not only the general public, but people of education like Earl Wemyss and others, should accept a man as an authority on so delicate a subject of intellectual perception as architecture, simply, as Iago says of Othello, "for bragging, and for telling them fantastical"—— but we will leave Iago to finish the quotation. This absurdity has been going on for a whole generation now. Years ago, when the same kind of demonstration of vulgar vanity appeared in the papers with the signature of "Beckett Denison," every one who knew the facts knew that the assumption of architectural knowledge claimed by that specimen of the "polite letter-writer" was a mere farce and pretence. And here is Earl Wemyss quoting Lord Grimthorpe's contemptuous denunciation of the work at Westminster Hall, and his suggestion that about a dozen modern architects should be blown up along with the steps! We cannot defend the architects in this case. One of them has done what we call, in its general conception, a most foolish and unarchitectural piece of work, and others have upheld him in a manner for which Earl Wemyss's suggestion, that architects backed each other up from notions of *esprit de corps*, really seems to us the most charitable explanation. But who is Lord Grimthorpe, that he is to condemn them? And does Earl Wemyss know that Lord Grimthorpe himself has disfigured a great national building with "restorations" of the most barbarous character, such as an artist like Mr. Pearson would be incapable of? If Earl Wemyss does not know the facts, he had better, if he pretends to have any acquaintance with Gothic architecture, go and look at the south transept of St. Alban's, and then publish an apology to the architectural profession for publicly quoting Lord Grimthorpe's impertinence in regard to them.

Lord Henniker's defence of the Westminster Hall work was as characteristic as anything in the debate. It was to be defended because it was his official business to defend it; and the defence amounted to this, that it was all regularly done according to the plans officially passed by a Committee of the House of Commons. The only deviation was that the steps had not been carried out as far into the floor of the Hall as the plans had first shown (and for that small mercy we believe those who care about the matter are indebted to us). "Henry III. cut doorways at the head of the large flight of steps, and Mr. Pearson, without knowing of the existence of that doorway, had designed one in the very same place, and in cutting it found traces of the old doorway, which had been built up and which now answered its original purpose. Those facts showed that the repairs, or whatever they might be called, to Westminster Hall were intended as a reproduction and not as a new departure." Lord Henniker does not seem to be aware that this is precisely the *gravamen* of the complaint against the whole business; that it is a foolish attempt at replacing what may have been there before, merely because it may have been there before, and not on any grounds of architectural suitability or practical utility. The additions were made to preserve a piece of Norman masonry in the outer wall of the Hall—the architect's admission to that effect is down in print in the blue-book of the evidence; and rooms have been built on the wrong levels; rooms which every one now sees are inconvenient in shape and plan, and nearly useless, as we foretold from the first they would be; and for which it has been necessary to project unsightly staircases into the Hall to get to rooms for which no one can find any use when they have got there: and all this under the plea of "restoration"—a restoration, in nearly all its details, purely conjectural.

As to Earl Wemyss's suggested panacea, of a special Standing Committee of advice of both Houses to consider such questions; in spite of Lord Rosebery's cruel sarcasm about the House of Commons consisting of "the 670 most intelligent men in the country," we can only remember, as Lord Rosebery said, that the actual procedure in regard to Westminster Hall was settled by just such a Committee as that would be; and we see the result. Earl Wemyss's remark as to the purely political nature of the appointment of First Commissioner of Works is quite to the point. He only remembered one First Commissioner for fifty years whom any one in private life would think of consulting if he intended to build a house. Our often-repeated suggestion has been that there should be a permanent Minister of Public Works, independent of political party, who should be appointed for his special knowledge of architecture and capacity for dealing with public architectural work. Beyond this, however, two other conditions are necessary, before we can hope to see our State architecture what it ought to be. One is, that the public should be better educated in the subject, and learn to find a "real interest" in it. The other is that architects should take a wider view of their profession and its meaning, and regard it as something more than the correct reproduction of the architecture of the past. There is evidence of a progress in this direction, but it is not very wide-spread as yet. That is the meaning of the Westminster Hall blunder. Mr. Pearson's reading of the old remains and their testimony was most ingenious; his restored details (always excepting the "fearful creatures") are as correct and refined as any one could make them. But that sort of thing is not what architecture is for; and the result is merely a foolish, costly, and inconvenient archæological plaything.

CONCRETE FLOORS.

BY FRANK CAWS, ARCHITECT.

THE strength of Portland cement varies greatly. All other things being equal, the finest-ground and heaviest is the best. The strength varies, not only from quality of material, but also, and very greatly, from age when used. The older the better, provided the old has been kept in a dry atmosphere. New cement is too hot and strong for immediate use. It sets more rapidly, and expands more, than old cement, and the result is an irregular and less reliable one. The maximum strength of a briquette of old cement is maintained, while that of a briquette of new cement is found to "go back," as the manufacturers phrase it.

Not only do the quality, fineness, and age of cement when used affect its ultimate strength, but also the mode of use largely governs the result. Thus, for example, the less the water used (all other things being equal), the stronger the product. And, again, if the briquette be made under heavy pressure, it proves much stronger than if made with minimum pressure.

The time in which the setting is accomplished, and in which the maximum strength is attained, varies greatly. The best cements mature most slowly. Large masses set more slowly than small masses. Masses whose surface area is large in proportion to their volume set in air more rapidly than masses whose surface area is small in proportion to volume. Masses under pressure set more rapidly than masses not under pressure. Thus the brick beds and joints of a piece of underpinning, built in cement, set as fast as built, and expand so as to neutralise the effect of pressure from the superimposed weight; but thick masses of concrete in floors and walls take a much longer time to set. For underpinning work, where quick-setting is needed, new cement answers quite as well, if not better, than old; but for floors the case is different.

Architects can easily specify old cement for their concrete floors, but they cannot easily get it. Generally the demand for cement is so heavy that manufacturers do not keep much old in store, except for purposes of seasoning the new.

The best way to obtain really old cement is to make a special compact with a first-class manufacturer, that his cement shall be specified, on the sole condition of his putting by a separate heap for the exclusive use of this particular contract. If the quantity of cement required be considerable,—say 50 to 100 tons,—it is worth the manufacturer's while to make such an arrangement; and, provided he has three months' full notice, he can generally honourably fulfil his promise. Having thus done his best to secure for his client the best cement in the market, the architect will now be well advised to make his calculations for strength on the assumption that he is getting, if not the worst cement obtainable, still a quality barely up to the average.

A briquette of matured strength and fairly good cement will stand a tensional stress up to 500 lb. per inch. Briquettes of one month old will break at a tension ranging from about 250 lb. up to about 450 lb. per inch, according to quality of cement, quantity of water, and mode of mixture, &c.; also according to the mean temperature during the month of setting. Briquettes mature more rapidly than thick floor slabs. Many contractors for concrete floors carelessly remove the centreing within one week, two weeks, and three weeks of setting. And, as a result, the floors are often permanently injured or weakened, visibly or invisibly, though seldom are they ruined and destroyed by it; for it takes more than common measure of folly to squander all the huge hoard of strength of a concrete slab.

In calculating strengths, the architect should reckon only on an ultimate tenacity of neat cement of 250 lbs. per square inch; though in all probability his best cement at twelve months old would, if mixed under best conditions, realise an ultimate tenacity of something like 1,000 lbs. per inch. And in no case should the centres be removed in less than five weeks; and if they can be maintained much longer so much the better, for special reasons which will hereinafter appear.

When brickwork, which has been built in fairly good Portland cement, is pulled down, builders find it impossible to clean the bricks for re-use. The cement cleaves so fast that it cannot be separated from the brick. This fact shows why in estimating the strength of concrete composed of cement and broken brick aggregate, the quality of the aggregate is so great a consideration. There is a marvellous difference between the tensile strength of good hard well-burnt bricks, and of soft ordinary stocks. No bricks, however, are so strong as cement. The best obtainable broken brick suitable for concrete aggregate probably possesses about one-fourth the strength of best cement; or from one-fourth to one-third, both tensionally and compressively. And for practical calculations it will be wise to treat the aggregate as possessing only one-fifth the strength of neat cement. When the aggregate and cement are combined, as in concrete, the strength of the concrete will depend, to a considerable degree, on the proportion of the two ingredients.

For concrete floors, the cement should be not less than one of cement to four of aggre-

gate. The concrete in this case will possess a strength of about two-fifths of neat cement; but, for practical calculations, it is safer to consider the concrete of this proportion of admixture equal to quarter strength of cement.

Just as in iron beams the greatest stress occurs in the flanges, and the webs are in comparatively little stress; so in concrete floors the material nearest the surface is in greatest stress, the top surface being in compression, and the bottom in tension. Thus, if concrete floors were cast in hollow homogeneous slabs, the vertical divisions connecting the top and bottom layers would have comparatively little stress to bear. Hollow floors of this sort cannot well be formed at small cost. But the same allowance for disposition of stress can be made in another way—viz., by first laying a thickness next the centreing; then, before that is fairly set, following upon it with an intermediate thickness; and, finally, finishing with a top thickness. Just as the flanges of a well-proportioned girder are very thin in comparison with the girder's total depth; so the first and last layers of concrete may be very thin in proportion to the total thickness of the slab. And what the narrowness of the web is to the girder, that the smallness of proportion of cement to aggregate in the central layer will be to the slab.

Instead, then, of mixing the whole thickness of slab one of cement to four of aggregate, a much stronger result will be obtained by making the bottom layer and top layer each about one-sixth the total thickness, and composed of one and a quarter of cement to two of fine crushed brick; and making the central four-sixths of concrete thickness, composed of one of cement to six of ordinary broken brick aggregate. In this case the cement still forms one-fifth of the dry bulk of cement and aggregate; but the cement, as will be understood, is disposed to better advantage. The bottom and middle layer should always be done in one day, and the top layer should be done on the following morning, or as soon after as to secure perfect homogeneity.

In ordinary cases, no such disposition of the cement in *flanges*, so to speak, is *intentionally* performed. But, fortunately for the strength of floor-slabs, where no fine bottom layer is separately and purposely laid as above recommended, the cement is deposited by gravity in much greater quantity next the ceiling level than at higher levels of the thickness; so forming, as it were, its own natural flange. Indeed, so remarkable is this sediment of the cement to the bottom of the slab thickness, that the most perfect impression of the board-centering is always obtained on the under surface; even the grain of the wood being so minutely reproduced as to deceive the eye into thinking the ceiling is really composed of boards, when the board-centreing has been entirely removed.

The joints of the wood centreing act as a sieve, and allow superfluous water to drip through. This is not desirable, because it not only drains away the cement with the water, but also introduces streams of motion in the concrete during the time of its setting, when it ought to be perfectly undisturbed.

An excellent method has lately been adopted for preventing this dripping and disturbance, and, at the same time, for securing a perfectly finished, smooth, fair ceiling of solid concrete, instead of the usual plaster skimming coat, which is liable to fall off, because the cement is so dense it affords very little key or suction.

The improved method is as follows:—Before the concrete is cast, the centreing is coated with a thin skin of plaster of Paris floated up perfectly level and fair. Upon this plaster surface a grout of pure cement and water is thinly spread, and upon this grout the concrete proper is cast, and beaten down in the usual manner. The skin of plaster of Paris is perfectly water-tight. Not a drop passes through it, and thus the concrete sets more slowly, and to better purpose; and when the centreing is eventually removed, the plaster comes away with it, and leaves the concrete solid ceiling smooth and fair, without a blemish or defect to mar its continuity of surface.

It is of the utmost importance to set the uprights which sustain the weight of centreing upon very sharp wedges of soft wood. The softness of the wood of these wedges admits of an infinitesimal deflection or yielding under weight, which is a useful relief to excessive stress; and, by slowly relieving the supports by means of the gradual loosening of these sharp wedges, the builder avoids that sudden *jar* of stress which tends, when centres are too suddenly removed, to damage the slab floor much more severely than years of heavy wear and tear. It is impossible to over-estimate the importance of this matter, for it is absolutely certain that, when the weight of the floors is transferred from the centreing to the haunches, or edges, or skewback abutments, of the floors, an infinitesimal, but none the less real, deflection of the centre of every slab *must* occur, and the almost utterly inflexible nature of the cement concrete slab renders it absolutely imperative that this transference and its unavoidable *set* or *sag* shall be accomplished with the utmost practicable slowness and avoidance of *momentum*.

The damage done to a slab by neglect of this precaution in removing centres is seldom, if ever, detected immediately. But the *weakness* is immediately produced by the jar of the sudden sag. And the evidence of this weakness is afterwards developed by the resistless force of expansion, which will surely find out the weak spots.

It is necessary now to show how this expansion comes about, and in what manner it acts upon the slab. And to show this, a very homely illustration will best serve, viz., the phenomena attending the baking of what is called a "tin loaf" of bread. The dough with which the tin mould is filled expands with the heat of the oven. Being confined at bottom and sides by the mould, the dough expands upwards in spite of its own weight, because the force of expansion is greater than the dead-weight of the dough. Being most free from contact and restraint at the centre of its upper surface, it there rises highest, and so forms a dome-like roof to the loaf. The expansion in this way so distends the upper skin of dough as to exceed its ultimate tenacity,—so the loaf cracks and opens at the crown to admit of the full degree of expansion due to the temperature to which the material is subjected. The tin mould so represses expansion that cracks in the sole of the loaf are very tiny or wholly absent.

If, before the loaf is half baked, but when it is set stiffly enough to sustain without visibly bending its own weight, if then it be turned out of its mould and supported (top side up as before) in the oven by a frame firmly gripping its four sides but leaving its top and bottom free to expand, any further expansion which it undergoes will cause a deflection and cracking of the bottom skin rather than of the top skin; because, in this case, the force of the expansion and of the dead-weight of the loaf act in the same resulting direction, viz., downwards.

The case is even so with the cement slab. The expansion which takes place, while the centre sustains the dead weight, results upwards in spite of the dead weight. But in many cases, especially with thick floors, this expansion is known to continue perceptibly for many months; and when the centreing is removed, at one week's or two weeks' or three weeks' limit, after casting, though the concrete is much more than able to sustain its own weight, like the half-baked loaf, its expansion is incomplete; and the remains of that irresistible force, acting downwards, aided by the deadweight of the material and the leverage due to its span, distends the skin of ceiling beyond its ultimate tenacity, and causes cracks, which, though they are mere skin cracks, present a very unpleasant appearance, especially to the uninitiated, who naturally, though mistakenly, refuse to believe, till convinced by actual experience, that such cracks in the ceiling of a concrete floor detract little, if any, more from its enormous strength than the crack of a lath-and-plaster ceiling detracts from the strength of timber-joisted floor above it.

In order, then, to avoid such expansion-cracks, and the want of confidence in strength of floor which those cracks mistakenly but naturally engender, the wisdom of maintaining the centre in position for at least *five* weeks (and as much longer as practicable) after casting concrete, is sufficiently obvious.

In addition to the maintenance of centreing, a further and most useful, though very inexpensive, precaution against expansion-cracks in concrete floors is the use of short iron cramps, embedded in the ceiling layer of concrete, at the middle of span, where the tension is sure to be most severe. These cramps, by resisting the stretch essential to deflection, compel the expansion, which cannot be repressed, to vent itself upwards, just as it would do if the centreing, instead of the iron cramps, were bearing the stress of the dead weight.

Inasmuch as the compressive strength of cement concrete is about eight times its tensional strength, it will be seen that the sectional area employed in tension must be about eight times as much as that engaged in compression, in order for the tensional and compressional forces to be about equal to each other. Thus, the great importance of the top layer, as the compressional member, so to speak, of the slab is evident. This consideration, together with the necessity for finishing the floor to stand the friction of traffic, shows the wisdom of putting a specially fine and strong finishing coat, when as yet the main body of concrete is only a few hours set.

It is also important that while this finishing coat is green it should be jealously protected from the wear of traffic, as workingmen's rough shoes, &c., have often in this way damaged a floor-skin before it set, and such damage is generally irreparable. The use of fine sand in the finishing coat should not be allowed. It disintegrates and spoils the surface texture.

The expansion of cement concrete during setting is effected by a practically irresistible force, to which the slab at once owes both its strength and its weakness.

If a long cylinder,—say, for example, a metal hollow column,—were well filled with cement concrete, the diameter of that concrete core would increase by expansion, in spite of the resistance of the column, but not to so great an extent as if unresisted. The resistance of the column to expansion does not, and cannot, reduce real, *i.e.*, molecular, expansion, but it compels the expansion to result in compression, which increases the density and strength of the mass. The metal column may, or may not, be cracked in the process; but, either way, the density and strength of its cement core is increased in direct ratio to the bursting pressure which has been exerted on the column. Thus, expansion contributes to strength of concrete in some ratio to the strength, or inflexibility, or inextensibility, or rigidity of the mould into which it is cast. If the column, or cylinder, were much thinner, and more yielding at the middle than at the ends, the resistance to increase of core diameter by expansion would be less at the middle than at the ends, and, as a consequence, the core diameter would actually swell more at middle than at ends; and the strength of the middle, per unit of sectional area, would be less than at the ends, by reason of the less compression and density. Thus, a very yielding part of any mould, by reducing the compression due to expansion, induces comparative weakness at that part.

Thus, in the case of concrete floors, when the centreing has been removed, and the weight and leverage of the floor and its load are left to act in the same resulting direction with the thrust of such expansion as is still going on in the immature mass, the skin is consequently broken, and cracks appear just at those parts where the centreing was most yielding. For example, if it be the case of a wide, long corridor floor, where no cross girders have been used, but where the concrete has been put down in one continuous slab, a crack will frequently appear, running

from end to end of the corridor, right along the middle of the floor soffit, because the centres have not been well propped in the middle. In such cases the crack will run right to the end walls, if the floor or its centreing, instead of *resting on*, has been simply *butted against* the end walls. But, if the floor and centreing have been properly supported on the end walls, the crack will terminate at each end of the corridor floor soffit, at about half the width of the corridor short of the end walls, *i.e.*, at mitre-line intersections.

It is not always practicable, without great expense, to provide centreing equally inflexible in every part. Indeed, it will generally happen that the centreing of a slab will be weakest in the middle. By carefully considering the most flexible points of the centreing, and the points of greatest bending moment to which the floor itself will ultimately be subject, the architect can place iron cramps, by anticipation, across the site of probable cracks, and imbedding these cramps in the substance of the floor, near the soffit skin, can so prevent the cracks occurring. In square slabs these cramps should generally be placed across the mitre lines, and in rectangular slabs they should be placed mostly across the crown, and also across mitre lines thus :—

It is desirable to keep such irons as near the ceiling level as practicable; because if placed higher up in the concrete thickness they are nearer the axis of neutral stress, and are correspondingly less effective.

Evidently, when centreing is equally inflexible at all points, repressed expansion, in the case of floor slabs, will be at all points in ratio to the weight of the floor; and the density will be, therefore, approximately equal throughout. And this, of course, is practically, or very nearly, the case in general practice.

But when the centreing is removed before the expansion has ceased (as unfortunately generally happens) then the after-expansion works differently from the former expansion, for, instead of inducing equal compression and density at all points, it induces greater compression and density of margins than of centre of slabs; so (apart from the question of centreing-flexibility), accentuating and contributing to the weakness of the centre of the slab.

Sometimes a yielding of centreing occurs through the subsidence of some individual column foundation, or through the insufficiency or entire absence of some temporary prop or shore. Whatever may be the cause of the depression, the middle of the depression is the centre of weakness, to which cracks radiate; as they do to the hole in a plate-glass window through which, or against which, a stone has been thrown.

This brings us to remark that the likeness between the conditions of stress and behaviour of window panes and of floor slabs is very close and instructive; and will repay investigation in some degree of detail.

It may be well at this stage to remark that well-holes, and other holes through floor slabs, should be of circular shape, or, at least, should have no square or sharp angles, because square and sharp angles are weak angles in cement concrete, as in cast-iron. But when openings with square angles are formed (as they unavoidably must often be), then they can be strengthened by embedding short iron cramps of quadrant shape at the corners of openings. Also, it must be remembered that if the hole be cut out of the corner of the square or rectangular slab, great loss of strength results; but not if the hole be cut out of middle of slab.

Expansion-cracks often occur in concrete pavements laid upon *terra firma;* and the shapes and directions of these cracks always, more or less plainly, demonstrate the truth already expressed, that expansion-cracks mark the lines of least resistance. If the edges of such pavement be confined between strong walls, or immovable abutments of any kind, the line of least resistance is midway between the abutments. Hence, in the case of a rectangle of say 10 ft. or 12 ft. wide, and of indefinitely extended length (as, for example, a passage pavement or street) if expansion appear anywhere, it will be found generally expressed in one long medial line of crack. Again, if in a courtyard of say 12 ft. or 15 ft. square or diameter, the edge of the pavement be next immovable walls, and if the pavement be laid with very hot cement, the central point of the pavement will be the point of least resistance; and cracks will radiate therefrom, having their fissures wider as they approach the point of convergence; and none of these fissures will extend quite up to the walls. If such a court were walled on three sides only, the point of common convergence of cracks would be found not in the middle of the slab, but nearer the uninclosed edge. If all the edges were uninclosed, and if the expansion were absolutely free to extend the mass horizontally in all directions, then no cracks would be seen so long as the measure of expansion did not exceed the measure of tenacity. But this is an impracticable freedom in the case of concrete pavements; the inertia and friction of the mass of the material, where no other resistance offers, alone suffice to repress expansion's horizontal movement, and compel it to issue vertically in the centre. In such cases, however, the edges do move horizontally further from the centre, and their expansion is horizontal, while the centre does not move horizontally, and its expansion is vertical; and, between these extremes of centre and edges, the intervening area of pavement expands both vertically and horizontally, the vertical element predominating towards the centre, and the horizontal element predominating towards the edges. For, as will be seen, the inertial and frictional resistance to horizontal movement of mass is at zero at the edges; and the inertial and frictional resistance to vertical movement of mass is at zero at the centre. Practically the horizontal expansion, though real, is infinitesimal, resulting in compression rather than in visible displacement of mass, while the vertical expansion is more pronounced. And thus it comes about that pavement laid with hot cement in large slabs on solid ground, will crack by expansion even when the edges are comparatively unconfined. And in fact, free expansion does exceed the tenacity of skin when the skin area is small in comparison with the volume of mass; and so it is only by repressing expansion we prevent skin cracks, and at the same time, by means of the force of compressed expansion, compress and consolidate the concrete. Thus, it is a fact, however paradoxical, that expansion compresses and strengthens the material by virtue of the resistance it encounters. The resistance is greatest round the edges, and least at the centre, and the concrete is consequently stronger, and more consolidated to a slight extent, round the edges than at the centre of slab,—a fortunate fact, for the edges of slabs of self-sustained floors need more strength than their centres.

Here, again, the loaf of bread admirably illustrates the same truth, for whether it be a "tin loaf" or a loaf baked without any mould, the edges of the sole are invariably the hardest and strongest crust, because at these edges the forces of expansion have met their toughest fight with resistance. Of course, irregularity of structure, due to the imperfectness of dough, may cause an occasional expansion crack even round the edges of the loaf sole. But such cracks are extremely exceptional. Similarly, a section of extra hot cement will blow and cause a crack anywhere. But such irregularities are to be obviated by well mixing before setting the material; and it is of the utmost importance to thoroughly mix the dry cement and aggregate before applying moisture.

The expansion of concrete floors must not be understood to imply or involve simply an increase of bulk; for while the interior of the slab's volume is still expanding, the exposed exterior surface has not only reached the limit of its expansion, but has actually, in most cases, begun to contract. And this contraction of the upper, or exposed, surface co-operates with the swelling of the heart of the slab, to produce not only cracks across the slab, but also a shrinkage round the skirting, or edges, of the slab, which in some cases is very noticeable, though of no practical consequence, generally speaking. F. C.

(*To be continued.*)

NOTES.

DEFECTIVE house-drainage often produces illness of which nobody knows but the persons concerned. On the 10th inst. John Albert Butler, twenty-seven years of age, died after a month's illness, at Coventry, of what the Medical Officer of Health said was blood-poisoning, the symptoms of which and those of typhoid fever were, he said, much alike, and that the illness in this case was caused by the condition of the drainage of the house in which the man had resided. Other persons in the same house were ill for a long time. At the coroner's inquest, on the 18th instant, the jury did not attribute crime to any one, but it may be well for those employed in laying house-drains to beware of the very small practical distinction between crime and carelessness when death is the consequence of either act, and that in any similar case a jury may give a different verdict. A plot of land was laid out for building upon through which a main drain was laid by the owner of the estate, having a proper junction with a public sewer. It was at first thought the fault was that this main drain had an insufficient fall, but the City Surveyor proved that that was not so,—that it had an inclination of 1 in 68, which was amply sufficient. From this main drain several house-drains were laid, as and when required, but the junctions for all were inserted in the main drain as the work proceeded, and into each of those junctions from which the house-drain was not immediately laid a plug—a piece of tile or slate—was inserted to keep back the earth until the time came for laying the house-drain. The labourer who was employed by the builder said that when he laid the main drain he plugged the junction of the house-drain with a piece of stone cut round to fill the socket of the pipe. One of the sewer men employed by the City Surveyor said he bared the drain of the house in question, near its junction with the main drain, and found a piece of tile fixed upright in the socket of the junction. The drain was blocked by this obstruction and was full of sewage, the house having been occupied since November last. He also found a piece of a 6-in. drain-pipe, 7 in. by 5 in. The man who laid the drain could not account for this being found. When he left the work from time to time he left it guarded by some loose bricks placed at the end of the pipe while he was away. All this is private work, the main drain included. The evidence was to the effect that "the builder's man made the connection of the house-drain with the main drain," and that "it was possible for a builder to make a junction without removing the plug." The Corporation had not, at the time of the inquest, taken over this main drain as a public sewer. The junction with a sewer had been properly made, and some general directions appear to have been given that all junctions should be inspected when being made, but further than that the Sanitary Authority probably could not go, after ascertaining that the inclination of the proposed main drain would be sufficient, and that its size and its adjuncts of manholes and lampholes were suitable to its situation in number and general form of construction. In such case, the main drain belongs to the owner of the estate, until he transfers the control to the town authority.

THERE should be no such thing as a main drain laid by the owner of an estate within a town for the purpose of dis-

posing of the land in building plots, and afterwards transferred to the town authority as a sewer. It should either remain a private drain or be laid at once by the town authority, such disposition of the property being made as to enable that to be legally done. It cannot long remain a private drain, for as the land becomes occupied by buildings, the ownership of portions of it becomes changed, within the curtilages of the houses, while that outside is disowned by all, as long as possible; but eventually it becomes public ground, and the main drain becomes a sewer. But the circumstances under which it has been made, and house-drains connected with it, often make it unworthy to be adopted as a public sewer. It may be said there is nothing to prevent a town authority laying such a main drain as a sewer at once; the owner would probably consent; but it may be observed that it is in the first instance for the benefit of the estate only, and economists (short-sighted though the economy be in such cases) who sit at meetings of the town authority jealously guard the public purse and prevent anything being done which might benefit any particular person. They act wisely in one sense, but in one only. They should take means to make it legal and binding on the public authority to construct all main drains as sewers wherever required. It is not difficult to ascertain whether any such proposed main drain would be a public advantage, and, if not, they can prevent its being constructed by refusing to allow its junction with a public sewer; but, if it would be so, it should be made at once by the town authority. The outlay, if not immediately compensated by the rapid occupation of the ground by buildings, must in general be so within no long time; but, whether the time be long or short, the health of a town demands that something should be done to prevent the recurrence of such cases as this we have referred to.

MR. DE RUTZEN is a magistrate who appears to hold some decisive and very salutary views as to what may be called the sanitary responsibility of landlords. Last week the owner and occupier of No. 6, Salutation-alley, Woolwich, were summoned before him for overcrowding. The Sanitary Inspector gave evidence to the effect that Bryan (the occupier) and his wife, their married daughter and her two children, lived and slept in one room 12 ft. by 10 ft. and 8 ft. high, giving a cubic capacity of 960 ft., while the law required 1,600 ft. (the two children counting as one adult). After some further information had been elicited as to the way in which the rooms were let, the magistrate said that in such cases the persons really to blame were the landlords, "who screw every penny from the poor tenants and let them live like dogs"; and he fined the landlord 3*l.* and withdrew the summons against the occupier. We put on record this decision as one which we hope to see made a precedent.

ONE of the most important, or at least one of the most-needed requirements in Sir Michael Hicks-Beach's proposed Bill for the regulation of railways is that which empowers the Board of Trade to order a railway company to provide a subway or bridge at any station or at any level crossing on a public carriage road. We call this one of the most important provisions, because it is one of those which railway companies show a disposition to neglect, even where they do their duty very well to the public in other respects. The requirements to use interlocking points and signals, a block system, and continuous brakes, are really putting in the form of a legal demand precautions of which railway companies themselves first set the example; but the provision of safe crossings is still neglected at many points, and as it is one of the things which do not immediately concern the safety of a railway company's actual customers, but that of occasional outsiders, it is the more desirable that it should be made a matter of legal compulsion.

IT is clear that the Parliamentary measure known as the Post Office Sites Bill, by which the site of Coldbath Fields Prison is to be covered with buildings connected with the Post Office Department, will have a rough Parliamentary journey. Last week it was talked out for the time, and the further consideration of the measure had to be adjourned for a future occasion. It is evident that the use of the site of this old prison is a good bargain for the public, but it takes up an open space, or, rather, what it is generally considered should be used as an open space, or for artisans' dwellings. It appears to us that some middle way might be found to enable this important site to be utilised for public buildings and also to afford breathing space for the people of Clerkenwell. A space such as that occupied by the gardens on the Thames Embankment might be thus laid out with walks and flower-beds. We do not refer to the actual size of the open space, but to its character as a surrounding or addition to buildings.

THE projected establishment of a new suffragan diocese to include Southwark receives fresh stimulus from a letter which the Bishop of Rochester has addressed to Mr. J. F. Field, warden of the Great Account of St. Saviour Parish, Southwark. He expresses his intention to help, to his utmost, a movement for restoring the Church, and for making it worthy to serve as a cathedral for South London. We gather that Sir Arthur W. Blomfield, A.R.A., has reported upon the untoward state of the transepts, choir, lady-chapel, crossing, and tower; and that efforts will be made to raise funds sufficient for re-building the modern nave (1838-9), which is at present closed, in a style more congruous with the old and beautiful portions of the fabric. On September 25, 1886, we printed an account, with several illustrations, of the church and its principal monuments. It will be enough just now to say that a granite tablet fixed against the western wall of the Lady-chapel close by Bishop Andrewes's tomb, bears this inscription:—

M [coat of arms] S
George Gwilt F.S.A. &c.
an eminent architect & a scientific man
born 8 Febry 1775 died 27 June 1856
lies buried in the south side
of St. Saviour's Ladye Chapel
the complete restoration of which
he gratuitously superintended
His daughter Hannah Jackson placed this tablet
as a tribute of much affection
mors janua vitae

The illustrated work of Mr. Francis T. Dollman, architect, entitled "The Priorie of St. Mary Overie, Southwark," was printed in 1881.

IN reviewing, on Nov. 3 last, Messrs. Rendle and Norman's illustrated work upon the inns of Old Southwark, we briefly cited the White Hart as having even a more stirring history than that of its neighbour, the Tabard. Within a few days all the remaining portions of that former hostelry, which, under this sign, at all events, dates from the beginning of the fifteenth century, will have disappeared, with the making of a new road, paved with wood, through the premises. Together with the Tabard (rebuilt), Spur, King's Head, George, and Queen's Head, in the Borough, it is named in the list given by Stow. Of these the Spur Inn-yard (No. 129) is quite modernised; the George (No. 77), mentioned as the St. George as long ago as 35 Henry VIII., retains part of its southern galleried front; the King's Head (No. 45), distinguished by its latticed-worked balustrades, finally succumbed four or five years since; and the Queen's Head (No. 105) has been identified as successor to the Crowned, or Cross, Keys, that is to say, the Keys of St. Peter, being one of the twenty inns in this quarter which are marked on the earliest authentic map of Southwark, *circa* 1545. John Taylor's "Carriers' Cosmographie" singles out the White Hart for the extent of its business; and Hatton avers "this is the largest sign about London, except the Castle Tavern in Fleet-street." In 1450 it formed the head-quarters of Jack Cade and his men. Of Cade's sojourn therein many particulars are to be read in one of the Paston Letters, in the Grey Friars' Chronicle, and in Holinshed. Hall chronicles that "the captain being advertised of the King's absence [at Killingworth Castle, Warwickshire], came first into Southwark and there lodged at the White Hart." Shakespeare, too, makes Cade to exclaim:—"Hath my sword, therefore, broke through London Gates, that you should leave me at the White Hart in Southwark?"* Nevertheless it is to be remembered that this, together with others of the Borough inns, was destroyed in the fire which in 1676 occasioned the destruction, either by burning or by demolition to stay the flames, of some 500 houses,—and, indeed, it had suffered much from a previous conflagration. The White Hart, King's Head, and George were rebuilt, and, in a measure, after their pristine fashion. Very few relics of that mode are now extant in London; the best preserved, perhaps, is the courtyard of the Old Bell, Holborn.

THE sale at auction of the Jourdans and Church farm estates in the parishes of, respectively, Chalfont St. Giles and Chalfont St. Peter, Bucks, demands a brief notice, for the former property encloses a burial-ground attached to the Quakers' "Meeting." Here, on August 5, 1718, was buried William Penn, who had passed the closing years of his life at Ruscombe, in Berkshire. There, too, had been interred his first wife, Gulielma Springett, and their elder son. The Quakers of this part held their meetings at Grove, in Chalfont St. Giles, previously to their acquisition of Jourdans. The author of "No Cross, No Crown,"—written in the Tower shortly after he had espoused the cause and precepts of his old Oxford friend, Thomas Loe—owned Stoke Park in this neighbourhood, having bought it from Anne, Viscountess Cobham, who inherited it from Sir Edward Coke. There stood the manor house commemorated in the "Long Story" of Gray. In 1799, John (grandson to William) Penn erected a sarcophagus in the park to the poet's memory. He rebuilt the house just 100 years ago, after James Wyatt's designs, which included two fronts in the Doric order. Richmond and Repton laid out the lake and grounds. Stoke Park subsequently passed to the Labouchere family; at the late Henry, Lord Taunton's death (1869), it was bought by Mr. E. J. Coleman. Lord Taunton is said to have sent to the Great Western Railway an additional cheque, finding that his property had improved after the incursion of the railway, for which his father, Mr. Peter Labouchere, had received compensation when the line was first laid. In 1886 the park was converted into a racecourse, and the house refitted to serve for purposes of a sporting club.

IN the last issue (vol. iii., Heft 4) of the Roman section of the "Mittheilungen" of the German Archæological Institute, there is an admirable paper by Dr. Studniczka on the study of archaic statues in general, and the well-known Artemis of Pompeii in particular. Dr. Studniczka rightly observes that the term archaic covers a very wide field, and encourages a generalization that is destructive to really close and distinctive criticism. In the term archaic are included (1) works of affected archaism, probably intended at the time of their making to pass for original works of the period they imitated: these are comparatively worthless; (2) works such as those that proceeded from the school of Pasiteles, which takes its inspiration from, but by no means slavishly copies, works of the Transitional period: these have their own charm, apart from the manner they reflect; (3) honest intentional copies of temple and other statues of note, which are as faithful as the skill of the copyist and the material

* Second Part of "King Henry VI.," Act iv., scene 8.

he uses will allow: this class is of great importance, as it enables us to recover ancient types otherwise irrevocably lost. The search for these types is but just begun; the material is at hand in every Greco-Roman museum. Such a statue, Dr. Studniczka holds, is the Pompeii Artemis,—perhaps the best-known and most admired of all archaic statues, both on account of the traces of brilliant colouring it still retains, and for a singular grace and charm in the pose of the goddess. We cannot follow here the course of Dr. Studniczka's complete and ingenious argument. The result he arrives at, —chiefly from an examination of coins,—is that the statue is a careful copy, executed about the time of Augustus, of a famous image made by two Naupactian artists,—Menaichmos and Soïdas,—of Artemis Laphria; an image which had been transplanted from its original home by Augustus and set up at Pakæ, and there worshipped with due honours down to the time of Pausanias.

DR. PAGE'S report to the Local Government Board on a prevalence of enteric fever at Mytholmroyd, in the West Riding of Yorkshire, attributes the insanitary state of the neighbourhood indirectly to divided sanitary authority and consequent want of systematic inspection and treatment. Dr. Page obtained evidence of unwholesome conditions of water-supply, drainage, and excrement disposal, "such as enteric fever when endemic in a place is habitually associated with." Among other things he reports:—

"In Sowerby division, five houses have been attacked by enteric fever during the past two years, out of twenty-two dwellings situated in the 'square' and draining into a stone highway sewer. I was informed that stone drains (since replaced by pipe drains) communicating with this sewer passed under the floors of three of the invaded households. In a dwelling-house situated near Calder Bridge, in another part of this division, wherein two cases of enteric fever had occurred in October and December of last year, the privy was placed in the corner of an outbuilding communicating with the house and projecting over the Cragg Brook. The water-supply of the household was obtained from a pump-well sunk upon the banks of the stream.

"In Todmorden division, three houses out of twenty-three forming an isolated row, known as Club Houses, have been attacked with enteric fever, the source of water supply, which had been condemned by the Medical Officer of Health, Dr. Lawson, being an open streamlet unprotected from pollution by cultivated fields and drainage. In connexion with these examples of fever prevalence in relation to various forms of excremental nuisance, the evidence implicating the River Calder as a source of infection may be considered here. There can be no question that this stream is highly polluted with sewage and excremental matters, and in its course through Mytholmroyd, is aptly described as little better than an open sewer."

The report also mentions cases of dwellings where "pail-closets provided with wooden boxes as receptacles for excrement were practically under the same roof as the dwelling, and unavoidably, from their position, ventilating into it." The village is at the meeting-point of four sanitary districts,—viz., Todmorden Rural, and Hebden Bridge, Sowerby, and Midgley Urban Sanitary Districts. The report says:—

"It would be difficult to explain, even by the aid of a map, the precise boundaries of each portion of the village which is comprised within the jurisdiction of these four sanitary authorities. By way of illustration of their intricacy, however, I may mention that on the occasion of my interview with the Chairman, Clerk, and sanitary officers of the Sowerby Urban District, none present could at the moment inform me whether certain named localities were in that or the adjoining Todmorden quarter of the village."

Not a few of these sanitary reports to the Local Government Board dwell on the difficulties thrown in the way of sanitary inspection and reform, even where individual sanitary officials are desirous to discharge their duties conscientiously, by the friction resulting from defective organisation. As Dr. Page observes, "A community without proper sewerage, largely dependent for water upon supplies that are polluted, and for the most part left to shift for itself in the matter of cleansing of privies and ashpits, is unquestionably in a very rudimentary sanitary condition. Such is the case of Mytholmroyd."

JUDGING from what we read of the speeches at the "Workers' Congress" at Paris, it seems hopeless to expect that the agitators for what is supposed to be the benefit of the working classes will ever learn to look at both sides of a question. In the report of the proceedings given by the *Times* Paris correspondent, it is stated that "Mr. Hobart related the successful attempt to create a union among the gas-workers in London, the number of unionists having increased from 80 to 5,000 in fourteen weeks. They had secured an increase of wages and a reduction of hours. This done, they were now menaced by improvements in machinery which would destroy these advantages." Imagine a leader of working men, as we presume this speaker claims to be, with all the history of the introduction of machinery and its results in evidence, still solemnly repeating the old worn-out scare about labour being "menaced by improvements in machinery"! Such teaching is worthy of the people who think they will all be better off by shortening their hours of labour; in other words, that the less work is done, the richer the world will become.

ARCHITECTURAL COMPETITION IN SWEDEN.

I.—RULES OF COMPETITION.

IN view of the unsatisfactory way in which architectural competitions have been conducted in Sweden, fifty-one of the leading Swedish architects have agreed to adhere to the following rules and conditions for such competitions, which will, no doubt, prove of interest to their British *confrères*. It may be added that the conditions are signed by Professor Isæus, architect to the Swedish Government; Herr Helgo Zetterval, chief architect to the Corporation of the City of Stockholm; Professor H. T. Holmgren, architect of the new Upsala University; Herr E. V. Langlet, who has the restoration of the ancient Cathedral of Upsala in hand, &c. In addition, they have been subscribed to by the Associates of the Society of Building of Stockholm.

Section I.

Competitions may be of three kinds,—viz. (1) general competitions, which are publicly announced, and in which any one may participate; (2) limited competitions, to which a certain number of architects are invited by written invitation; (3) double competitions, consisting of a prior general competition, followed by a limited one among those who have gained prizes in the former.

Section II.

For all such three competitions the following uniform regulations have been adopted respecting the programme of conditions which is to constitute the basis for the competing designs:—

1. The programme shall be framed by, or at all events,—before competition is invited,—be examined and approved by the jury.

2. The programme should in all its stipulations be as clear and brief as possible.

3. The programme shall distinctly distinguish between absolutely binding conditions, from which no departures must be made, on one side, and conditions which are only put forth in the way of information or desire on the other.

4. Should the programme contain any statement as to cost, the latter should only be given approximately, but the estimates sent in should be carefully tested.

5. The programmes should always specify exactly the drawings desired, and the scale on which they are to be prepared.

Section III.

For general competitions the following special regulations are also in force:—

1. Invitation to general competition, officially announced, must state time and place for the delivery of the drawings, the number of prizes and their amount, as well as the name and position of all the members of the jury. Herewith it should also be observed that the time allowed is sufficient for the competition.

2. The members of the jury must be odd in number and half of them architects.

3. Architects on the jury must not participate in the competition either openly or anonymously.

4. Every drawing forwarded for competition must be designated by some motto or other sign of identification, and accompanied by the name of the competitor under sealed cover. Only for those designs that have been awarded prizes these covers must be opened, and such opening shall be made publicly or under official control.

5. Designs are disqualified from competition in the following cases:—(*a*) if the design reaches the place of reception after the time appointed, unless the competitor can prove prior to the decision of the jury that this was due to no fault of his; (*b*) if there be a departure from the expressly stipulated conditions of the programme.

6. All prizes must be distributed in complete accordance with the tenour of the programme. Should nothing be stipulated on this point, the prizes shall be awarded in order of merit of the designs, &c., and not according to their smaller or greater absolute value.

7. Should the number of competitors be smaller than the number of prizes, the larger ones shall be awarded first.

8. All the designs premiated become the property of the invitee; the others shall be returned.

9. If nothing to the contrary be specially stipulated in the programme, the competition is considered as wholly independent of the erection of the building; the competitors compete in this case solely for the prize, not for the execution.

10. Immediately after the decision of the jury, all the drawings submitted shall be publicly exhibited.

Section IV.

Limited competitions, for which a certain number of invitations is issued, presuppose (*a*) that the erection of the building has been definitely decided upon; (*b*) that the invitee is fully prepared to confide its erection to one of the competitors.

In such competitions the following special conditions are in force:—

1. The invitation to compete, which shall always be accompanied by a programme, must notify time and place for the delivery of the drawings, as well as the names of the jury; and it should be observed that the time allowed is sufficient for the purpose in view. It should also be stated whether the drawings are to be submitted anonymously and accompanied by motto, sign of identification, and sealed name.

2. In these competitions there should be no graduated prizes, the competitors competing solely for the execution.

3. As fee for the labour entailed in the drawings, each competitor, irrespective of the result of the competition, should receive a sum, named in the letter of invitation, and which is the same for all, this sum being also the price of purchase of the drawings.

4. Each one of the competitors should be apprised of the result of the competition.

Section V.

In double competitions all the rules stated in Section III. are in force for the first competition and those of Section IV. for the second.

Section VI.

In all competitions the jury should be fairly remunerated for their work.

II.—BASIS AND CONDITIONS FOR THE FIXING OF ARCHITECT'S FEES.

Basis of Calculation.—For drawings, estimates, description, and supervision the fee is payable on a certain percentage of the cost of building. The percentage is further defined in respect of:—

A. The amount of artistic skill required in the work.

B. The extent of work of the architect.

C. The building material.

D. The cost of the building.

A. Division into Classes according to the degree of Artistic Skill required.—For work requiring greater architectural skill the fee to be higher than where lesser artistic skill is required, although the cost of the work to be executed may be the same. In this respect buildings are divided into four classes.

Class I.—Buildings of the commonest kind, such as outhouses, stables, stores and depots, factories, labourers' dwellings, and similar plain structures.

Class II.—(*a*) Buildings named in Class I., which are to be specially ornamented or constructed, requiring special drawings; (*b*) public buildings, such as schools, churches or chapels, hospitals, barracks, and plain structures of similar kind.

Class III.—(*a*) Buildings named in Class II., the arrangements of which require a heavier form of construction or more artistic labour; (*b*) works of repair or alteration, as well as structural additions of an ordinary kind.

Class IV.—Works of repair or alteration and structural additions of a heavier kind.

B. The Extent of Work of the Architect.—This is divided as follows:—

I. Sketch.—A clear drawing upon a smaller scale to serve as basis for the principal drawings, accompanied, if demanded, by an approximate estimate of cost.

II. Principal drawings.—Complete drawings upon a larger scale, consisting of plans, elevations, and sections, together with an approximate estimate of cost, if such has not already been furnished with the sketch.

III. Estimates and description.—A calculation of cost with specified qualities and prices, together with an indication of the materials recommended, and the method of working.

IV. Working and Detail Drawings.—All constructive and ornamental drawings required in the execution of the work.

V. Supervision.—(*a*) Supervision of the artistic execution of the work; (*b*) supervision of the entire technical work of building.

C. The Building Material.—In respect of material, buildings are divided into:—1. Buildings of stone, iron, &c.; 2. Buildings of wood.

D. The Cost of the Building.—The cost is divided in such a manner that a relatively larger fee is charged for lesser work, the percentage decreasing in proportion to the cost of the building. For the calculation of the fee the cost is divided thus:—

1. Up to 10,000 kronor.*
2. From 10,000 to 20,000 kronor.
3. „ 20,000 „ 50,000 „
4. „ 50,000 „ 100,000 „
5. „ 100,000 „ 200,000 „
6. „ 200,000 „ 300,000 „
7. „ 300,000 „ 500,000 „

For expenditure above 500,000 kronor, *vide* note 2 below.

* 1 krona=100 öre=1s. 3½d.; 18 kronor=20s.

Special Compound Fees for Architect's Work.

The architect's fee for undertaking entire work is calculated in the subjoined table in percentage of the cost of the building:—

Buildings of Wood.

When the work of the architect in respect of wooden structures is in general equal to that upon buildings of more solid material, but the cost of the former being less, his fee is increased by 50 per cent, upon the figures before given.

1. However, in respect of supervision of the technical execution of artistic work upon wooden buildings, the fees are double of those stated above.

2. If the cost exceeds 500,000 kroner the fee is to be calculated upon the scale laid down here.

III.—GENERAL RULES.

1. If the competition should terminate upon the furnishing of sketch only, the fee is increased by 50 per cent.

2. On the cost increasing beyond the scale upon which the architect has calculated his fee, the highest figures of the lower scale are to be allowed.

3. Should the building not be erected, the architect is to calculate his fee upon his own approximate estimate; or where such have been drawn up, upon the final estimate. If the building is completed, and the cost is less than that estimated by the architect, his fee is to be calculated upon the smaller sum; and if the cost is more than estimated by him, his fee is to be calculated upon his own estimate, no extra fee being allowed upon the excess.

4. If, however, after the fee has been decided upon, alterations be made in the construction of the building entailing a greater expenditure the fee is to be calculated also upon the excess on the same scale as the estimate.

5. If the building, through more costly ornamentations or alteration of construction, is raised from one class to one above, the architect charges his fee upon the higher scale.

6. Fees for sketches, principal drawings, and estimates are payable upon the delivery of each; for working drawings as they are completed; and for supervision in proportion as the work progresses.

IV.—WORK FOR WHICH FEES CANNOT BE CHARGED UPON THE ABOVE BASIS.

a. Interior and exterior decorative work not connected with the building operations which the architect has undertaken, is paid for according to agreement.

b. This is also to be observed for surveys and measurements of old buildings.

c. If the architect has to travel in connection with work for which he is commissioned, he is to receive 20 kr. a day in diet money, and if the journey does not result in his being commissioned, 30 kr. a day. In addition, his travelling expenses are to be paid in both cases, viz., first-class steam-boat, and second-class railway fare, and two horses for posting.

BUILDINGS OF STONE, IRON, &c.

	10,000 kr.	20,000 kr.	50,000 kr.	100,000 kr.	200,000 kr.	300,000 kr.	500,000 kr.
CLASS I.							
Sketch	0·40	0·40	0·35	0·30	0·20	0·20	0·15
Principal drawing	0·70	0·65	0·60	0·55	0·50	0·40	0·35
Estimate	0·25	0·25	0·25	0·20	0·15	0·10	0·08
Working drawings	1·00	0·90	0·80	0·70	0·60	0·45	0·40
Supervision, *a*	1·00	1·00	1·00	0·95	0·85	0·60	0·52
Total ...	3·35	3·20	3·00	2·70	2·30	1·75	1·50
CLASS II.							
Sketch	0·50	0·45	0·40	0·35	0·25	0·20	0·15
Principal drawing	0·90	0·80	0·75	0·70	0.60	0·55	0·50
Estimate	0·25	0·25	0·25	0·25	0·15	0·15	0·12
Working drawings	1·25	1·25	1·10	0·90	0·70	0·65	0·63
Supervision, *a*	1·50	1·25	1·10	1·00	0·90	0·85	0·80
Total ...	4·40	4·00	3·60	3·20	2·60	2·40	2·20
CLASS III.							
Sketch	0·55	0·55	0·45	0·40	0·30	0·25	0·25
Principal drawing	1·05	1·00	1·00	0·90	0·80	0·75	0·70
Estimate	0·30	0·30	0·30	0·30	0·20	0·20	0·15
Working drawings	1·50	1·50	1·45	1·25	1·05	1·00	0·90
Supervision, *a*	2·00	1·65	1·40	1·25	1·15	1·05	0·90
Total ...	5.40	5·00	4·60	4·10	3·50	3·25	3·00
CLASS IV.							
Sketch	0·65	0·60	0·50	0·45	0·40	0·35	0·30
Principal drawing	1·25	1·10	1·05	0·95	0·90	0·85	0·80
Estimate	0·35	0·35	0·35	0·30	0·25	0·20	0·15
Working drawings	1·90	1·75	1·50	1·30	1·20	1·15	1·10
Supervision, *a*	2.25	2·00	1·70	1·40	2·25	1·20	1·15
Total ...	6·40	5·80	5·10	4·40	4.00	3·75	3·50

THE EXTENSION OF THE METROPOLITAN RAILWAY.

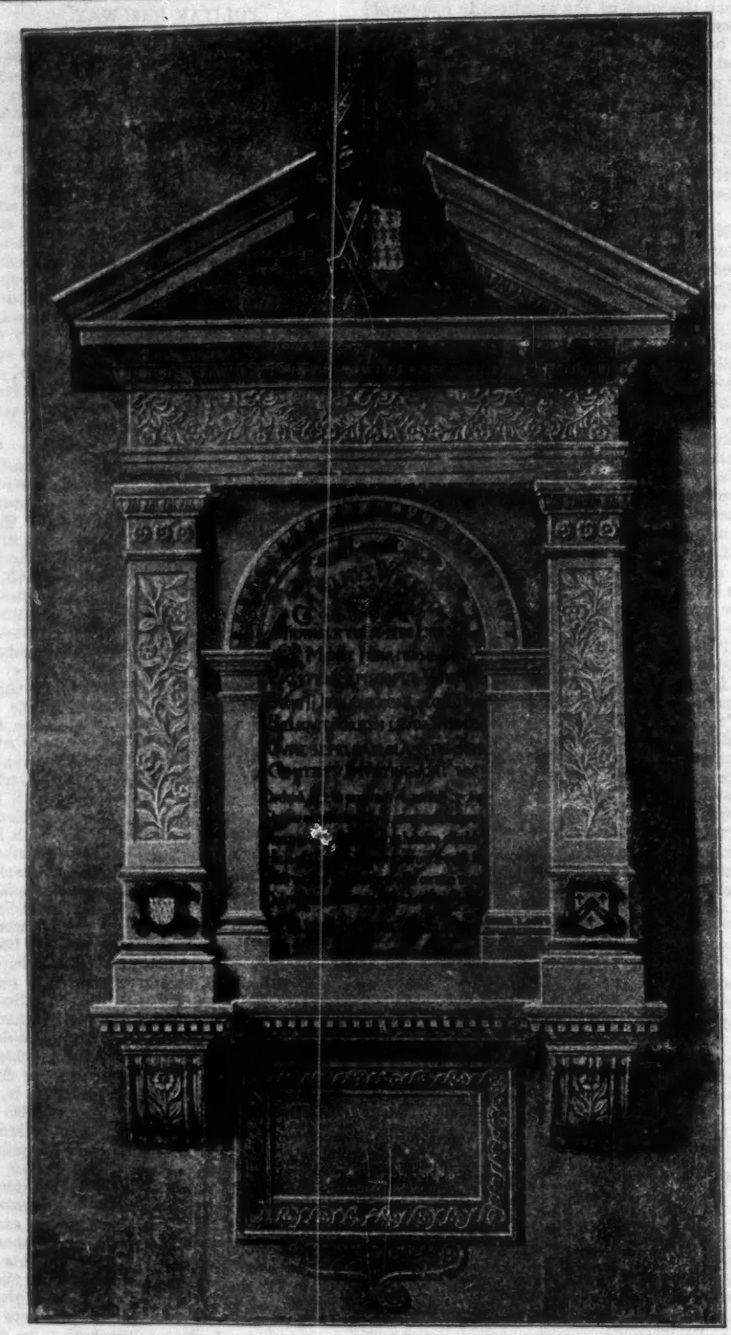
THE recent opening of the extension of the Metropolitan Railway to Chesham makes this line something more than a mere London railway. In fact, the child is swallowing up the parent, since the St. John's Wood line, as it used to be called, is now much longer than the Metropolitan line proper; and when it is completed to Aylesbury, the provincial system will really be more important than that in the Metropolis. Chesham is twenty-eight miles from London, and thus the Metropolitan must henceforth be classed among the lines which serve completely rural districts. For Chesham is the centre of a quiet and thoroughly agricultural neighbourhood, though not without a certain amount of special trade of its own, in the shape of boot-making. The extension will be welcome to many Londoners, for it will open up a picturesque and interesting district, and the pedestrian who goes into the country for a day's walk will not soon tire of the new parts to which he will now have access.

Chesham itself lies picturesquely in the valley of the Chess. Until the railway reached it, it had an old-fashioned air about it which carried one back quite into the last century; but, for actual interest, Chenies rather than Chesham is the place which is most attractive. It is within an easy walk either of Chorley Wood Station, the next to Rickmansworth, or of Chalfont-road. The interest of Chenies is manifold; it is in itself a picturesque village amid hanging woods by the banks of the Chess; it has a kind of idyllic neatness, not unmixed with rural prosperity.

If the inhabitants are to be judged by their houses, temperance and thrift appear to be their characteristics. Unfortunately, the residuum must find its resting-place somewhere, and a single village of this character really tells little of the actual state of the district generally. Then there is the church, with its side-chapel, which has long been the mausoleum of the Russell family. This chapel, with its many monuments, has been so well described by Mr. Froude, in his Essay on "Chenies and the House of Russell," that no prudent writer will do more than refer an intending visitor to this excellent piece of literary work. But the free access which has hitherto been granted by the Duke of Bedford to this chapel is now at an end. This was an inevitable consequence of the proximity of a railway in direct communication with London, for we fear that a good many of the visitors on a Bank Holiday would have had little scruple in embellishing the beautiful alabaster monument of the first Lord Russell with their initials. The fact is, it must be well safeguarded, for the long series of monuments in the chapel makes it a national treasure, whether we regard it from the point of view of the student of art, who desires to note the progress, or it may be the decadence, of monumental sculpture in this country, or of the student of history, for whom each monument suggests stirring events in many periods of our national annals. The remains of the Manor House, which was rebuilt in the time of Henry VIII. to the west of the church, gives a good idea of its appearance when it was of large enough size for Queen Elizabeth to be entertained there, in 1570, by Francis, Earl of Bedford. It still forms a feature of great picturesqueness, its warm red tints harmonise pleasantly with the surrounding elms, and the graceful chimneys catch the eye above the western terrace.

Chalfont St. Giles is two miles from Chalfont-road Station, a place of great literary interest, for the cottage still exists wherein Milton lived when the Plague raged in London. It was here that he began to write "Paradise Regained," and as his dwelling still remains intact, it is easy to picture the home of the poet as it was in bygone times.

Chorley Wood Station stands on the edge of the Common, which is likely to make in the future its immediate neighbourhood a favourite place of residence, until, like some commons near London, it becomes too habitually a resort of the roughest kind of holiday-folk. The actual line, as completed, has given occasion for a good deal of work; in places deep cuttings have been made in the chalk hills; in others, "Bottoms," as they are called in Bucks, have had to be filled to keep the line at a correct level; but these engineering obstacles add to the pleasing variety of the journey from Rickmansworth to Chesham. Of Rickmansworth itself there is nothing to be said; that William



Monument to William Wickham II., Fourth Protestant Bishop of Winchester.
Mr. G. H. Kitchin, Architect.

Penn lived there after his marriage may still arouse a languid interest in some passing visitor; and we can still well understand how George Eliot, who also lodged there for a time, retained little of it in her recollection except the astounding number of public-houses it possessed.

But there are drawbacks to the pleasure of our imaginary traveller. The carriages of the Metropolitan line are altogether unfit for a journey of more than a few minutes. The second-class compartments are the worst of their kind in England, and those of the third class are little better than cattle-trucks. The rolling-stock has not been constructed for long journeys, and, consequently, when it is taken over the lengthier spaces between the country stations, it jars and shakes the traveller in a way, which reminds him of the flimsiest of Continental railway-carriages. Again, at present the Company take forty minutes (except in the case of one train each way during the day) to compass the seventeen miles to Rickmansworth, and the patience and temper of the most good-natured of travellers can scarcely tolerate this slow rate of progress.

From the shareholders' point of view, in spite of the sanguine expectations of the Stock Exchange, it may be doubted whether they will gain by this new movement. A country line must have a proper terminus, and Baker-street Station can only be described as an inconvenient shed. The Company have spent 9,000*l.* on improvements at the main-line station, and will have to spend 30,000*l.* in no long time on a new station for the country line. There is no accommodation for passengers with luggage, and every station on the line outside London is better than the Baker-street terminus. New rolling-stock and a double line are necessities of the near future. With a further extension to Aylesbury and Towcester will come a strong competition with the North-Western and Great Western lines,—a formidable prospect for a Company like the Metropolitan, which can only pay a dividend of 3 per cent. on its Ordinary Stock. But with these points the general public is not concerned, though it will demand an efficient service and reasonable comforts from Sir Edward Watkin and his subordinates if they undertake to carry them at all.

THE LEVY MEMORIAL FOUNTAIN, SYDNEY.

THIS fountain is the gift of the children of the late Honourable Lewis Wolfe Levy, M.L.C., to their fellow-citizens of Sydney, New South Wales. It comprises a fountain with a number of jets and four drinking fountains for public use. (See general view on next page.)

The base is of a highly-polished red and grey granite, prepared at the works of Messrs. Freeman, Penryn, Cornwall. The figure which surmounts it,—a water-nymph in bronze,—was

modelled by Mr. C. B. Birch, A.R.A., and cast, with its accessories, at the foundry of Mr. Moore, at Thames Ditton. The figure was exhibited at the Grosvenor Gallery Exhibition this year.

The architects from whose drawings and specification the whole was contracted for are Messrs. Edmeston & Gabriel.

The hydraulic work is supplied by Messrs. Handyside & Co., of Derby, and the bronze basins for the drinking fountains by Messrs. Hart, Son, & Peard.

MONUMENT TO WILLIAM WICKHAM II., FOURTH PROTESTANT BISHOP OF WINCHESTER.

A MURAL monument in the style of the latter part of the sixteenth-century has lately been erected near the south entrance to the choir of Winchester Cathedral, at the expense of the bishop's direct descendant and namesake, Mr. William Wickham, of Binsted-Wyck, High Sheriff of the County. The monument has been designed by and executed under the direction of Mr. G. Herbert Kitchin, architect (who also designed the altar-tomb for the remains of Bishop Courtenay, 1487-92).

The monument is carved in Caen stone, with a beautiful alabaster slab, on which the ancient inscription is cut, and the letters are gilt. On the apex of the pediment are the bishop's mitre, surmounting a shield surrounded with the motto of the most noble Order of the Garter, as

The Levy Memorial Fountain, Sydney.—Messrs. Edmeston & Gabriel, Architects.

prelate of the order, on which are the arms of the see impaling the bishop's family arms; ermine, on a bordure engrailed gules, eight mullets, or; on the base of the pilasters supporting the pediment are two small heraldic shields, the first being the arms of the Wickham family, as above; the other, the arms of his wife Anthonina, daughter of William Barlow, Bishop of chichester, viz., argent on a chevron engrailed, between three crosses crosslet fitché, sable; two lions passant, counter passant of the first. On the alabaster slab is the following inscription:—

GULIELMUS WICKHAM.
Translatus a sede Lincoln
Mense Martii 1595,
Existens Episcopus Winton
Obiit ii Junii proxime sequentis.
Reliquit uxorem laudatissimam
Quæ sepelitur in Awkenbury
Comitatu Huntingdon.

Doctrina, antistes, præstans et moribus æquis,
Eloquio et pietate gravis; mensaque manuque
Non parcus, justi neglectus honore sepulchri
Hic jacet. O seclum insipiens verum æquior illi,
Dum moritur, Deus aligeros dat cernere missos,
Qui migrantem animam Cœli ad sublimia ferrent.
FM posuit 10 Junii A.D. 1600.

Underneath the monument with the above inscription, formerly in the Church of St. Mary Overy at Southwark, and which Stowe says "is on a very fair stone by the Communion Table":—

"Hoc Epigramma supra scriptum
Olim in Ecclesia S. Mariæ Overy apud Southwark
Marmore incisum: ne periret
Reverendissimi Episcopi prosevi sui memoria
Hic reponendum curavit
Gulielmus Wickham de Binsted-Wick Armiger
Hoc anno Comitatus Suthanton Vice comes
Ad. MDCCCLXXXVIII."

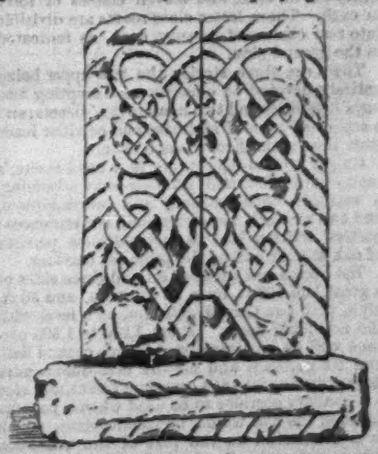
[TRANSLATION].

"Lest the memory of the Right Rev. Prelate, his ancestor, should perish, William Wickham, of Binsted-Wyck, Esquire, High Sheriff for the County of Southampton, caused the inscription engraved above, which was formerly carved in stone in St. Mary Overy, Southwark, to be set up in this place, in the year of our Lord, 1888."

Houses of Parliament for Sweden.—At present no fewer than 130 Swedish architects are engaged in preparing designs for the new Houses of Parliament and other buildings to be erected in Stockholm.

MANBY CHURCH, LINCOLNSHIRE.

ON Wednesday, July 17, the Bishop of Lincoln was present at the service held on the occasion of re-opening of the chancel of the above church, which has been restored for the rector, the Rev. F. D. Hall, by Mr. Arthur C. Blomfield, M.A., son of Sir Arthur Blomfield, A.R.A. The church is of Early Perpendicular date, and consists of nave, chancel, and tower. At a period probably about 100 years ago, a barn-like structure, with no pretensions to architectural or ecclesiastical effect, with plain, square-headed windows of brick, was added in place of the original chancel, which, it is supposed, was either destroyed by fire or purposely demolished at some previous time. The walls were composed of green sandstone, with which the nave and tower are faced, intermingled with brick, and were in a very unsatisfactory state. The south wall was standing on the original foundations, but the east wall was some 6 ft. further west, thus curtailing the chancel to a very inconvenient and unsightly proportion, the north wall being also inside the line of the old foundations. The roof was found to be in a rotten and dangerous state, composed partly of the old chancel roof-timbers, of which however, many were found to be in a good state of preservation, with Early Perpendicular mouldings, which have been used again in the new roof. Two rudely-cut angels, formerly occupying positions under the slope of the intermediate principals, were also found in the roof. They are holding shields with crosses upon them, and bear traces of red and white paint. These, together with the tie-beam and two principal rafters, have been re-used in the new roof, the wall-plates being formed of the old purlins, which were neither in a sufficiently good state of preservation nor long enough to use again for their original purpose. None of the old oak rafters, of which a few only were found, were fit for re-use. A flat lath-and-plaster ceiling hid the top of the chancel-arch, of which the top stones appeared above the roof, the aperture thus formed being covered with lead. Upon demolishing the walls, portions of the jambs of the old east window were found, though not sufficient to determine the curve of the arch nor the pattern of the tracery. A portion of the old cross and saddle-stone of the east gable were also discovered, and a quantity of chalkstone, which has been utilised to form an arched recess for the organ on the north side of the new chancel. The most interesting discovery was that of three stones, which were found built into the wall, of a pre-Norman date, of which two were apparently portions of a pair of tomb slabs (see accompanying illustration) with a well-defined interlaced pattern cut in the face, the third being a flat and narrow stone with a diagonal double pattern on the edge. There was also found embedded in the walls a small stone about 1 ft. square, with a portion of a geometrical pattern cut on the face. Some old Roman tiles were also found.



The new chancel, which has been built on the lines of the old foundations, is built of Weldon stone facing and brick and plaster lining, as much of the old green sandstone as was fit for re-use being worked in in horizontal bands.

The roof is composed of the old oak mentioned above, deal rafters and boarding, and pitch-pine purlins and traces. The altar and

chancel stalls are of oak. The floor is of biscuit and enamel tiles, by Messrs. Minton & Co. The work of rebuilding has been carried out, we are informed by the architect, in the most careful and efficient manner, by Messrs. Rudd & Sons, of Grantham. It was begun on April 23, and finished for the opening ceremony on July 17.

Illustrations.

NEW CHANCEL, ST. EDMUND'S CHURCH, BUNGAY.

THIS is a view of the interior of the new chancel added to the Catholic Church at Bungay, Suffolk, and consecrated by the Bishop of Northampton at the beginning of the year.

It is connected with the old church by a new chancel arch with elaborately-moulded jambs and carved capitals and arch mouldings.

The reredos is in Caen stone, with Devonshire marble shafts, super-altars, &c., and was executed by Mr. A. B. Wall, of Cheltenham, from the designs and details of the architect.

The oak wainscoting round the sides of the chancel, and the carved parapet at springing of the roof, were also executed by Mr. Wall.

The rest of the work, by the express wish of the donor (Mr. Frederick Smith, of Bungay), was entrusted to local men,—Mr. Read for the brickwork, &c., Mr. Foulger for the carpentry, and Mr. Nursey for the masonry. The windows are all filled with stained glass; the east window and one of the side ones being entrusted to Messrs. Hardman, of Birmingham; two side windows to Messrs. W. B. Simpson, of London; and the other two to Mr. Swaine Bourne, of Birmingham. The brass communion-rails, lamps, &c., were supplied by Messrs. Hardman.

The architect was Mr. Bernard Smith.

THE NEW GRAMMAR SCHOOL FOR BEDFORD.

THE Harpur Trustees are about to re-erect their famous Grammar School upon a new site near St. Peter's Church, at the south end of the cricket and football ground of the school.

Mr. E. C. Robins, F.S.A., has been selected, after competition, as the architect, and the plans have been approved by the Charity Commissioners. The cost of erection will be about 23,000*l.* for the buildings only.

The design is in the Tudor style, as shown by the perspective view here given. The buildings will be faced with red bricks and Weldon stone dressings, with Broseley tile roofing.

The accommodation is for 936 pupils, in eleven classes of thirty in each, six classes of thirty-six in each, and eleven classes of forty in each. These latter class-rooms are divisible into two classes of twenty each, as indicated in the ground-plan.

There are three stories, the two upper being entirely devoted to class-rooms, excepting two boys' lavatories and two housemaids' closets; and a separate fireproof staircase and corridor leads from the ground-floor to each floor.

On the ground-floor there is a head-master's room, with office and printing-room adjoining, a master's common-room and waiting-room, and two master's lavatories and conveniences; porters' waiting lobbies and entrance porches of oak at each end of the principal corridor.

The rooms are grouped around three sides of a great hall 100 ft. long, 50 ft. wide, and 50 ft. high, with two tiers of galleries, on a level with the adjoining floors. From 1,200 to 1,500 persons will be accommodated in this central hall, and its galleries and all the class-rooms have doors opening into the corridors direct, and also a secondary corridor to be used when a passage through the hall would be inconvenient, which is a concession on the part of the architect, whose principle of school-planning is opposed to the introduction of such corridors, for the reasons expounded in his published works on the subject.

On the north side of the great hall is an external ambulatory, divided by a projecting centre block forming a porch below and an organ-chamber above, with a turret to reach the roofs and for a flag-staff. The boys' conveniences are in detached buildings.

A detached building will be erected for the chemical laboratory and lecture-room, the experimental and preparation-room, the combustion store, balance, and master's room, with covered way to the main building.

STAIR HOUSE, LAMBERHURST, KENT.

WE publish this week a drawing of the above, showing a practical rebuilding and enlargement of the house.

The new building stands on a stone plinth, and has hollow brick walls and stone window and door dressings, the half-timber work being of solid oak; the remainder of the external walls of the upper floors are covered with hanging tiles, and the roofs also are tiled.

The work has been satisfactorily carried out by Messrs. Beale & Son, of Tunbridge Wells, and the architects are Messrs. Christopher & White.

SCULPTURE FROM THE HENRY IV. TOMB, CANTERBURY CATHEDRAL.

THE sketch represents the effigies of Henry IV. and his second wife, Joanna of Navarre, from their tomb on the north side of the Trinity Chapel, Canterbury Cathedral. The figures lie recumbent upon an altar tomb of alabaster, ornamented with niches and carvings of elaborate and beautiful workmanship; above is a canopy of delicate design in oak, enriched with designs in colour. These were destroyed by some person who had permission to copy them. In Strickland's "Queens of England," the effigy of the Queen is described as that of a very lovely woman, with features small and regular, the eyes and eyebrows very long, and the head singularly high and very broad. The Royal mantle is fastened to the back of her "cotehardi" by a jewelled band, which passes round the corsage, and rich brooches clasp the mantle on the shoulders. Round the throat is a collar of SS., the oldest specimen extant of this ornament. Studs set with jewels are placed down the front of the cotehardi, which is a light jacket trimmed with ermine, without sleeves (the arms being bare), round the hips is a band of jewels as a belt, from which her gown falls in full folds over her feet. Both figures were formally enamelled in colours.

In 1832 an old account was published stating that the king's body was, during a storm, thrown into the sea near Gravesend by the attendants on its journey by water to Canterbury.

To ascertain whether there was any truth in the account, part of the coffin was sawn away, and a leaden coffin was discovered within it. This was so small that hay-bands had been inserted to keep it from shifting about on its journey to Canterbury. It was moulded to the figure, and on being cut open the face was discovered in perfect preservation. The question still remains, however, whether the body is the king's or not. The rude way in which the inner lead case has been inserted with hay-packing, the cross of twigs lying upon the breast, and the perfect condition of the skin (King Henry's features having been much disfigured by leprosy), lead one to suppose that the body of the King was thrown into the sea, and replaced by another corpse by those who had charge of it. However, there a body lies, side by side with the body of the Queen. Whether it be that of her Royal consort or that of some obscure member of society, much honoured in death, will for ever be a mystery.

F. D. B.

SHREWSBURY MONUMENT, SHEFFIELD.

THE tomb from which these effigies are taken is the earliest and finest of several in the Shrewsbury Chapel of Sheffield parish church. It stands under a canopied arch of somewhat debased character, opening into the chancel. The figures themselves are remarkably fine, exhibiting a correctness and grace of modelling rare in works of this class. With Mediæval repose in feeling they combine the refinement of the Renaissance in detail, and have, in fact, been attributed to Italian workmanship. They have been engraved by Blore in his usual delicate manner, but hardly with detailed accuracy.

The right-hand lady has a tomb and effigy of her own in the church of Erith, Kent, where she appears to have been buried.

W. RANDOLPH.

PARIS EXHIBITION ARCHITECTURE.

THE three pavilions of which we give illustrations, from the buildings erected for the Paris Exhibition, are among those which will have to be removed after the close of the Exhibition, but they are of sufficient architectural merit and importance to be worth putting on record.

Of the main façade and dome, designed by M. Bouvard, we gave a kind of skeleton illustration long before the Exhibition opened, from one of the officially-accepted elevations; but this does not convey much of its true effect when completed.

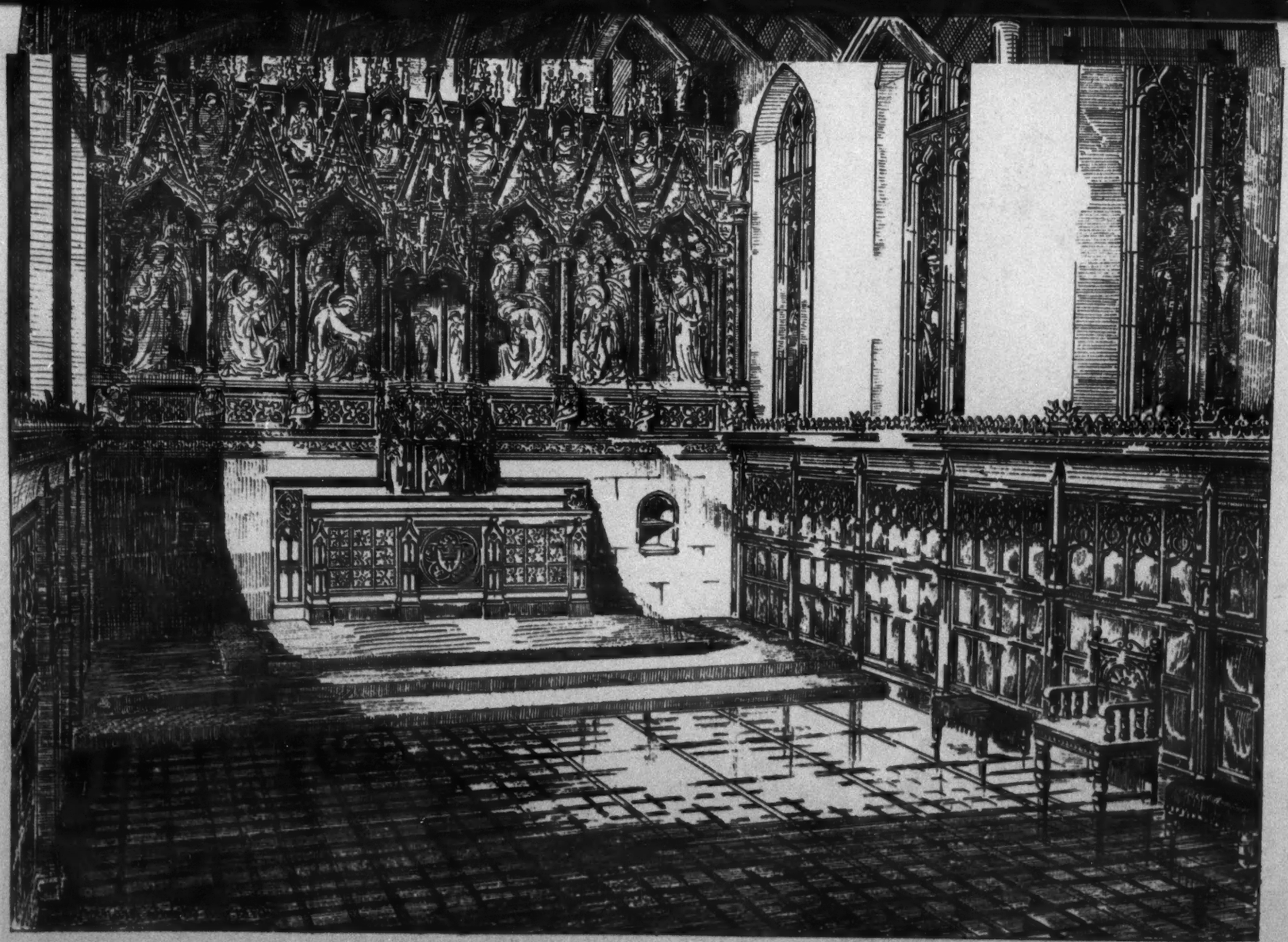
The classical pavilion of the Ministry of War, shown in another illustration, was designed by M. Walwein, and the pretty façade of the "Pavillon d'Hygiène" is the design of M. Girault.

All the façades were described and commented on, in some detail, in the general article on "The Paris Exhibition," in the *Builder* for May 18 last.

THE SOCIETY FOR PRESERVING MEMORIALS OF THE DEAD.

THE third general meeting of this Society for session 1888-89 was held on Monday afternoon last, in the rooms of the Royal Archæological Institute, Oxford Mansion, Regent-circus, Col. the Hon. H. M. Hobart-Hampden in the chair.

Mr. F. Chancellor, F.R.I.B.A., Mayor of Chelmsford, read a paper entitled "The Darcies of Essex and their Monuments." The paper commenced by saying that the Darcy family claimed descent from the Norman knight De Areci, who came over in the train of the Conqueror, and whose descendants, the ancient Barons d'Areci or Darcy, of Lincolnshire and Yorkshire, Dugdale, in his "Baronage," traced down to his own time, 1675. Dugdale also stated that the Essex family was a branch of the old family of Lincolnshire, but he was not able absolutely to connect them. It was probable that Henry Darcy, who was Sheriff of London in 1327, and Lord Mayor in 1337, was a son of Norman Darcy, of Lincolnshire, a baron of the time of Edward I., who died in 1296. This Henry Darcy was apparently the first of the family who was connected with Essex. In 1329 he purchased from the FitzHumphreys the manor of Great Yeldham, near Halstead. Members of the family possessed property at Pebmarsh in 1411, and eventually four branches of the family established themselves in the county—viz., at Danbury, Maldon, Tolleshunt Darcy, and St. Osyth, where, as well as in numerous other parishes in the county, they had large estates. Weever attributed the three effigies in Danbury Church to the Darcy family, but the author of the present paper thought that was incorrect. Some of the family were probably buried there, but there were no monuments now existing. The Maldon branch of the family was really a continuation of the Danbury branch, for Robert Darcy, of Danbury, who was Sheriff of Essex and Herts in 1419, married a rich widow of Maldon, daughter of one FitzLangley, and they were both buried in the Church of All Saints or All Hallows, Maldon, where he founded three chantries. The same Robert Darcy was supposed to be the builder of the present Town-hall at Maldon, which he originally built as a moot-hall for his manor, but subsequently presented to the Corporation, who still possesses the grant, dated Jan. 27, 1440. The Tolleshunt Darcy branch of the family was probably founded by John, the second son of the before-named Robert, as he married a daughter and co-heir of the last of the Boys family, former owners of the manor of Tolleshunt Tregoz, as it was then called. The St. Osyth branch was formed by the migration to that place of the Maldon family in the person of Thomas, Lord Darcy, great grandson of the Sir Robert Darcy of Maldon, who purchased of King Edward VI., for 3,974*l.* 9s. 4½d., the Monastery of Chiche St. Osyth, together with numerous manors and lands in that parish, and in Great and Little Clacton, Little Holland, Fingringhoe, West Mersea, Abberton, Messing, Southminster, Wigborough, Pelton, and other parishes. The monuments of the Darcies in the Church of All Saints, Maldon, have been, with one exception, ruthlessly destroyed. The one that remains is mutilated; it is a stone mural monument, fixed on the south wall of the Darcy Chapel. It consists of a canopied niche, with a double arch over,—the lower one very flat, and the upper one an ogee arch, crocketed and terminating in a bold finial. On either side is a panelled buttress, terminating in a pinnacle, also crocketed. The niche is filled in with a marble slab, originally inlaid with brasses; but



CHANCEL OF ST. EDMUNDS (R.C.) CHURCH, BUNGAY.—Mr. Bernard Smith, Architect.

NEW CHANCEL TO
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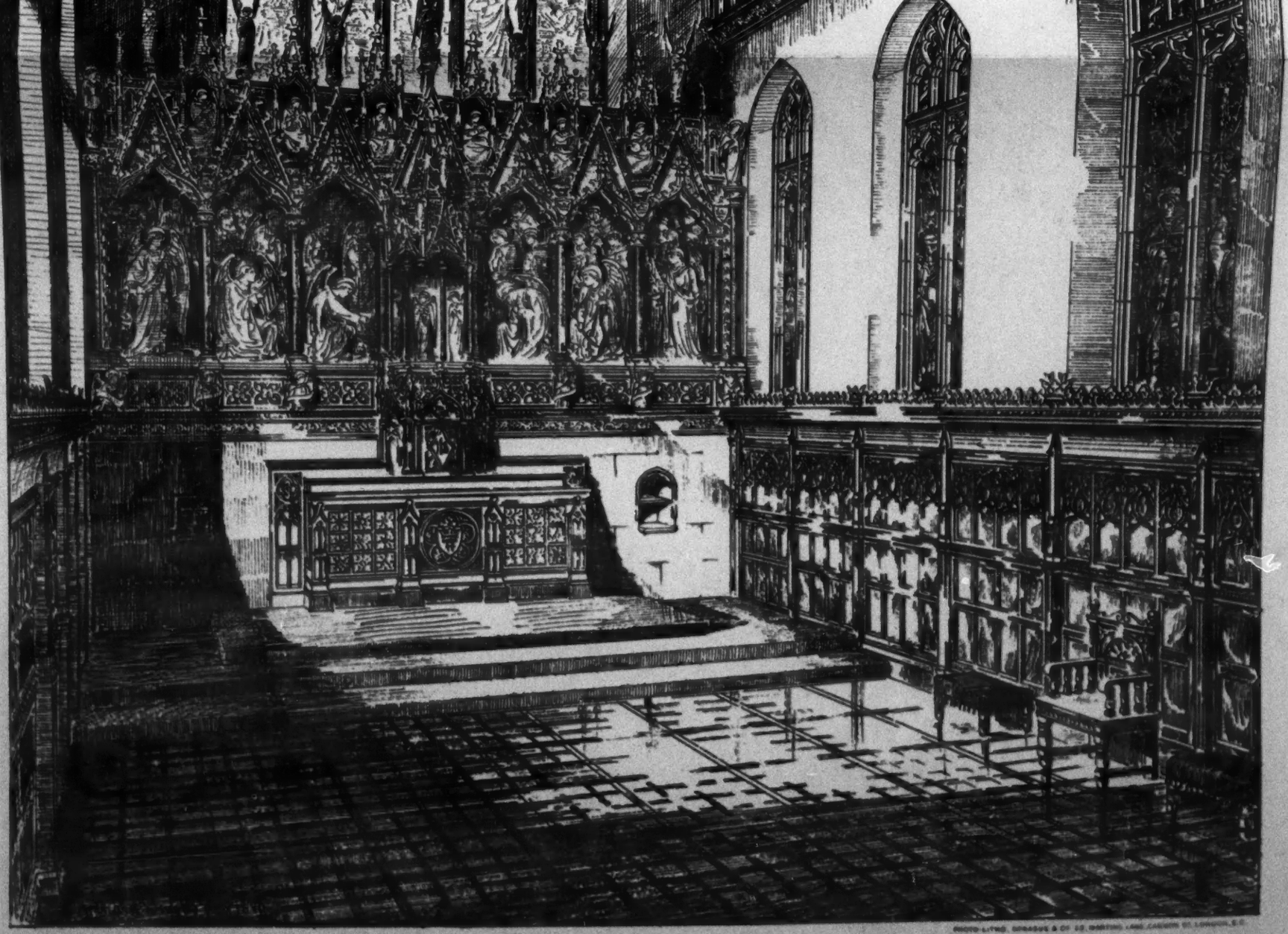


CHANCEL OF ST. EDMUNDS (R.C.) CHURCH, BUNGAY.—Mr. Bernard Smith, Architect.

THE PAVILLON DU MINISTERE DE LA GUERRE; M. WALWEIN, ARCHITECT.

The Phototype Co., 308, Strand, London

PARIS EXHIBITION ARCHITECTURE.

THE PAVILLON D'HYGIÈNE; M. GIRAULT, ARCHITECT.

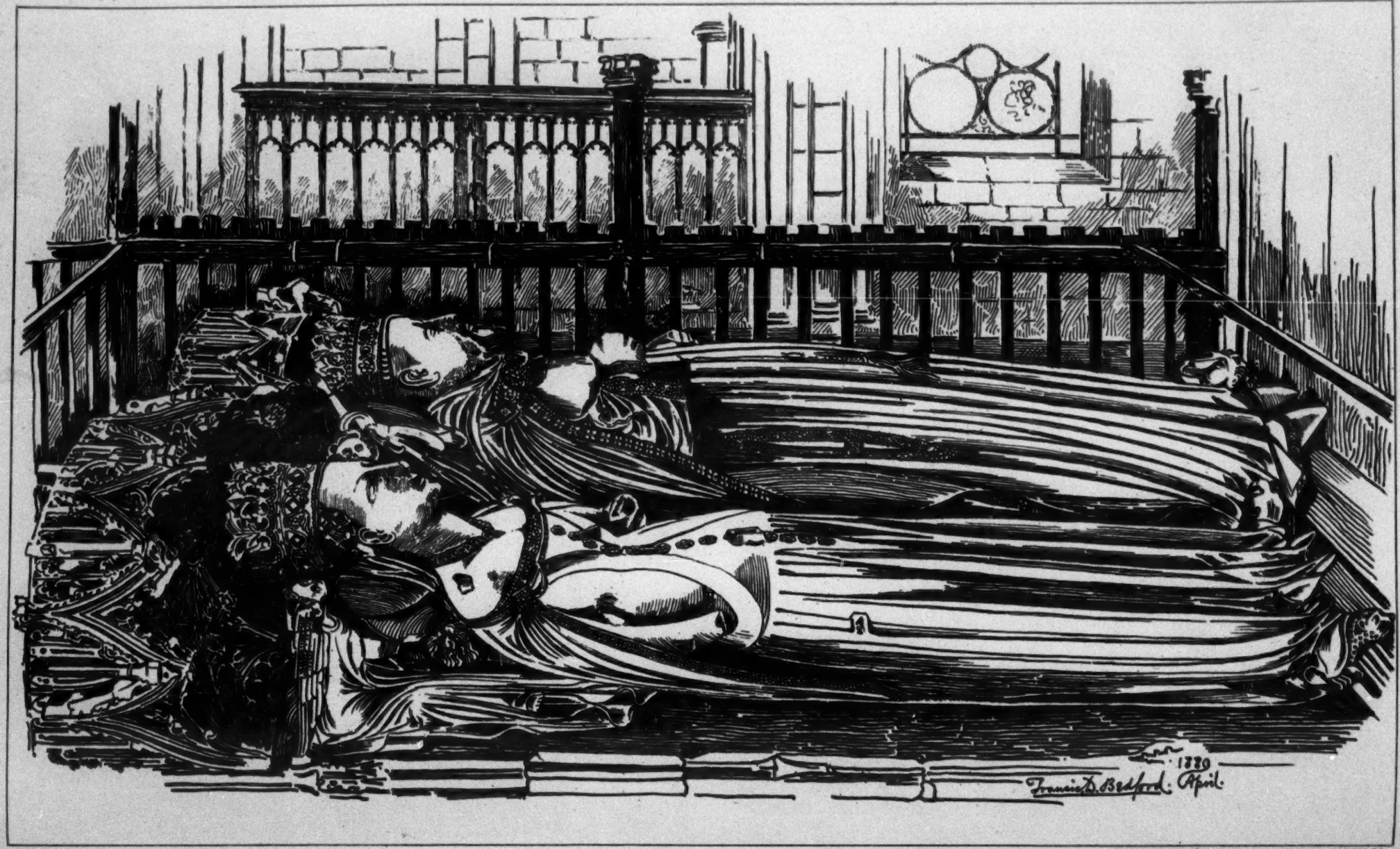
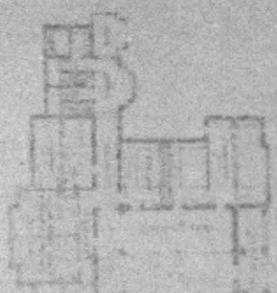


PHOTO-LITHO. SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON, E.C.

MONUMENTAL FIGURES OF HENRY IV. AND HIS QUEEN, CANTERBURY CATHEDRAL.—From a Drawing by Mr. Francis D. Bedford.



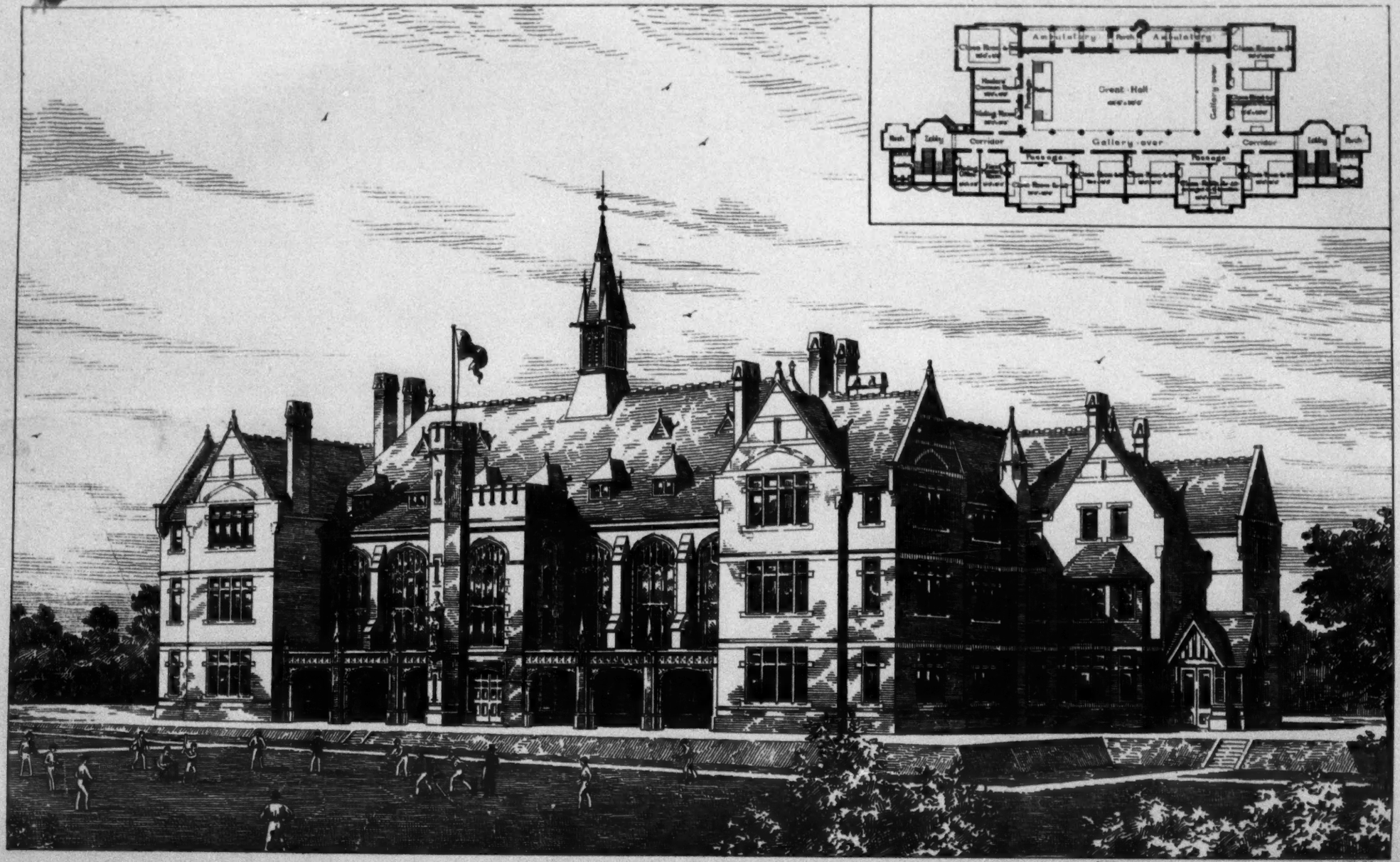
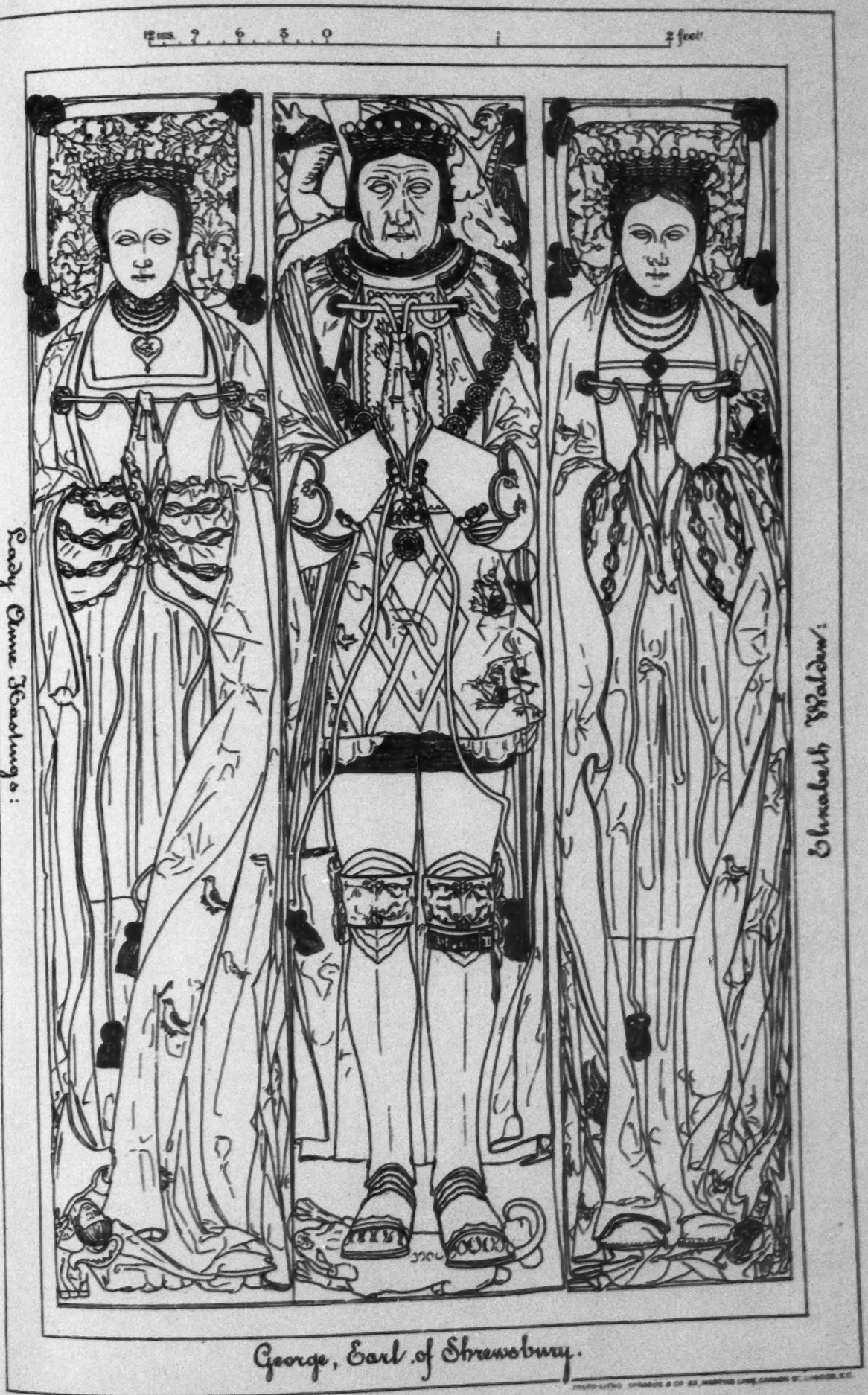


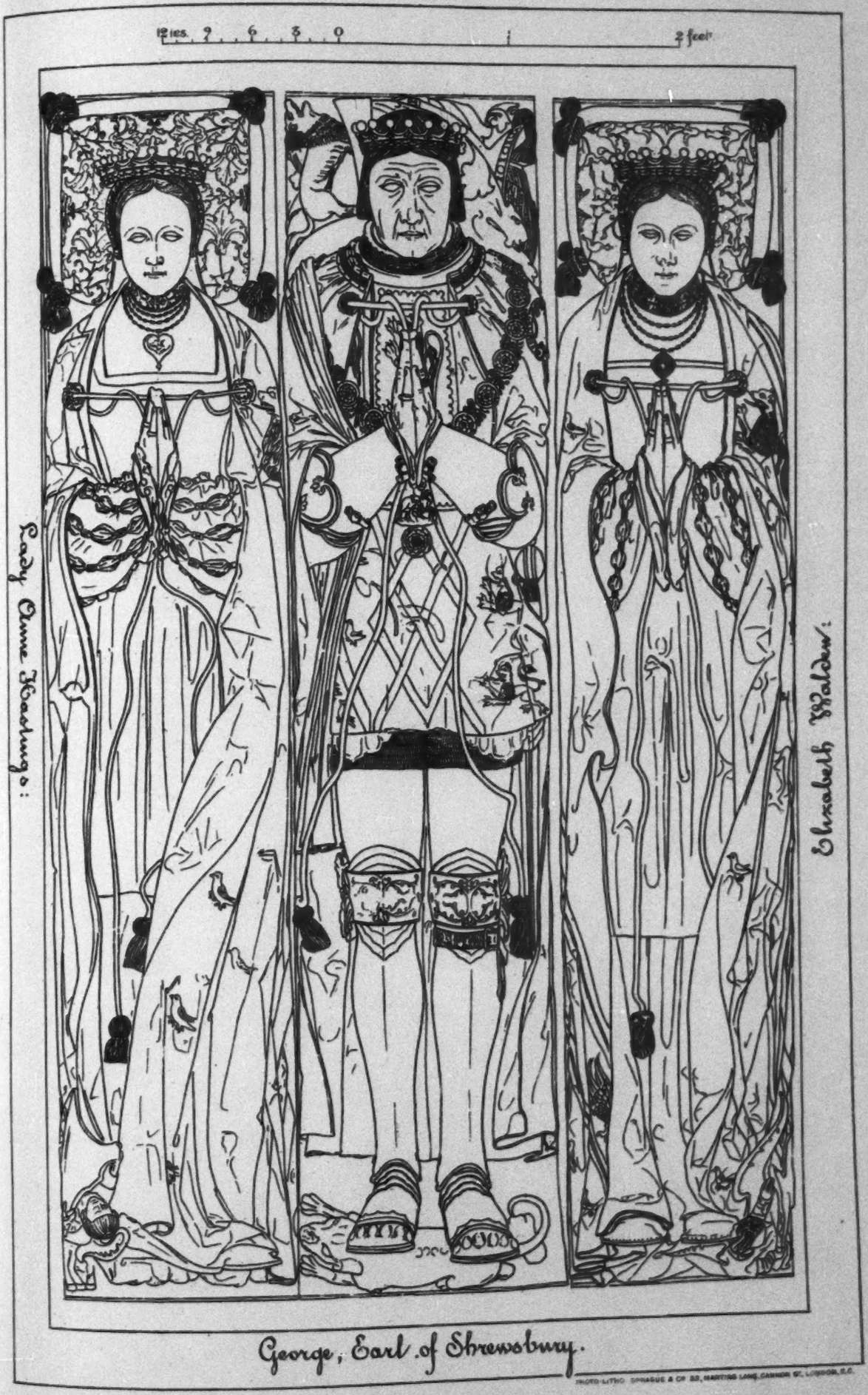
PHOTO-LITHO SPRAGUE & Co 22 MARTINS LANE CANNON ST LONDON, E.C.

THE NEW GRAMMAR SCHOOL, BEDFORD.—Mr. E. C. Robins, F.S.A., Architect.

STAIR HOUSE, LAMBERHURST, KENT.—Messrs. Christopher & White, Architects.



THE SHREWSBURY MONUMENT, PARISH CHURCH, SHEFFIELD.—From a Drawing by Mr. W. Randolph.



THE SHREWSBURY MONUMENT, PARISH CHURCH, SHEFFIELD.—FROM A DRAWING BY MR. W. RANDOLPH.

The Phototype Co., 338, Strand, London.

PARIS EXHIBITION ARCHITECTURE.

THE CENTRAL FAÇADE AND DOME: M. BOUVARD, ARCHITECT.

these are all reaved: they consist of two effigies, apparently kneeling and facing each other. In Tolleshunt Darcy Church there are several monumental remains of the Darcies, but the principal one is a mural monument to Thomas Darcy and his wife. It is constructed of alabaster and marble. In the centre are the figures of Thomas Darcy and his wife,—the former shown in the armour of the period (he died in 1593), and the lady in the flowing robe of the period, with a tight-fitting bodice with slashed sleeves, a ruff, and a veil dependent from her head; both figures are kneeling on cushions at a faldstool, on which lie two books. Below the effigy of Thomas Darcy are his three sons, kneeling, and below the effigy of his wife are their six daughters, also kneeling. The monument of Thomas, first Lord Darcy, on the south side of the chancel of the Church of St. Osyth, is a sumptuous composition, and executed in alabaster and marble. It is 17 ft. high by 9 ft. wide. The design consists of an altar-tomb with panelled front, upon which lie the effigies of Lord Darcy and Elizabeth, his wife,—the daughter of John de Vere, the fifteenth Earl of Oxford. He is arrayed in the half-armour of the period, with puffed breeches, and a ruff round his neck. Below him is the effigy of his wife. All the details of these effigies and their dresses are beautifully executed, and there are remains of colour upon both. The monument of John, the second Lord Darcy, on the north side of the chancel of the same church, in general character and design bears a strong resemblance to the monument of his father just referred to. On the east wall of the south chancel aisle of the same church is a monument to another John Darcy, described in the inscription as "Kinsman and freinde to the Right Honourable Thomas Lord Darcy, Earle Rivers." Originally it was, no doubt, very similar in character to the other two monuments, but the architectural decorations and armorials have nearly all been destroyed. On the south wall of this aisle or chapel is a mural monument, much defaced, to the memory of "Briant Darcie, Esqr, late Highe Sheriffe of ye Countie of Essex, ye third son of Thomas Darcie of Tolhshunt Darcie in ye said Countie. The said Bryant died ye 25 of Decem. 1587." In conclusion, Mr. Chancellor gave a brief outline of the history of the Abbey of St. Osyth.

On the motion of Mr. Edward Walford, M.A., seconded by Mr. C. F. Hayward, F.S.A., a vote of thanks was passed to Mr. Chancellor for his interesting paper.

We may add that Mr. Chancellor is now engaged in bringing out an illustrated and descriptive account of the monuments of the County of Essex; and that the Society for Preserving the Memorials of the Dead is considering the details of a Bill having for its object the preservation of monuments in churches and churchyards. The secretary of the Society is Mr. W. Vincent, Belle Vue Rise, Hellesdon-road, Norwich.

COMPETITIONS.

Board Schools, Beckenham.—We understand that Mr. Robson has recommended the Beckenham School Board to accept the plans submitted in competition by Mr. John Ladds, architect, for their new schools in the Arthur-road, Beckenham. They are planned to seat 800 children, and to be enlarged ultimately to seat 1,200. The Board have instructed Mr. Ladds to complete the plans and specification.

Board Schools, Sheffield.—At the meeting of the Sheffield School Board last week, it was reported that the committee had considered the report of Mr. E. R. Robson upon sets of plans submitted in competition for the schools proposed to be erected at Neepsend and Carlisle-street, and they recommended that the plans marked "Hallamshire" should be adopted for Neepsend, and the plans marked "Light and Air" for Carlisle-street. The envelopes were opened, and it was found that "Hallamshire" was Mr. J. B. Mitchell-Withers, and "Light and Air" Messrs. H. Hodgson and J. E. Benson, of Bank-street. In the first school, the award of £15 to unsuccessful competitors went to Messrs. Hodgson and Benson for a second set of plans, and of £10 to Messrs. Wightman & Wightman. The plans placed second and third in the Carlisle-street competition were both by Mr. C. J. Innocent, so the third prize went to Messrs. Wightman & Wightman, who sent in under the signature of "The Don." Mr. Robson, in his report, said:—

"I am bound to say I have never had competitions for Board schools which have occupied so much time in the actual investigation. This has arisen from the singular merit of the majority of the plans. In most cases the report turns on the question, 'Which plan is least objectionable?' In the present cases it has been exactly the contrary. I think the architects of Sheffield are to be congratulated on the distinct advances made in their knowledge of the subject. But for the fact that some competitors have had to be excluded on technical grounds, I think it would have been even more difficult to arrive at a conclusion as to which plans were best. I am particularly sorry in the competition for Neepsend that 'The Don' (Messrs. Wightman) had to be so excluded, and am equally sorry in that for Carlisle-street that 'Hallamshire' (Mr. Mitchell-Withers) has met the same fate, for both these set of plans and designs are evidently the result of skill, pains, and knowledge.

Congleton Town-hall.—The Corporation of the borough of Congleton recently invited schemes in competition for the heating and ventilation of their Town-hall, one of the late Mr. E. W. Godwin's works; and the first premium was awarded to Messrs. Wm. Sugden & Son, Leek. These works are now about to be carried out under their direction; also the insertion of new promenade balconies and capacious end gallery (supported by carved and moulded teak posts) in place of the present highly-elevated gangways; concrete and wood-block flooring to the whole of the large assembly-room, and other alterations and additions, are also decided upon.

Police and Fire Brigade Station, Newcastle-on-Tyne.—The Corporation of Newcastle-on-Tyne have, on the recommendation of their Assessor, Mr. Murgatroyd, of Manchester, selected the design of Messrs. Quilter & Wheelhouse, of London, for the proposed new Police and Fire Brigade Station at Elswick-lane.

SURVEYORSHIPS.

Chelsea.—On the 17th inst. there was a gathering at the Chelsea Town Hall of gentlemen concerned in the local government of Chelsea, for the purpose of making various presentations to Mr. G. R. Strachan, C.E., on the occasion of his retirement from the post of Surveyor to the Vestry of Chelsea. The chair was taken by Earl Cadogan. The chief presentation came from the members of the Vestry, and consisted of a writing-table in English oak, a silver tea-service, a gold watch for Mrs. Strachan, and an illuminated address. —Earl Cadogan, in making the presentation, spoke at some length of the services rendered to the parish by Mr. Strachan. Mr. Strachan feelingly acknowledged this testimonial. Just before the beginning of the Vestry meeting a case of drawing instruments was presented to Mr. Strachan on behalf of the officers of the Vestry. In addition to these presentations, Mr. Strachan received from the Vestry workmen an ivory rule and a set of ivory travelling chessmen, together with the following gratifying address: "This testimonial is presented by the workmen of the Vestry of Chelsea to Mr. George Richardson Strachan, A.M.I.C.E., Surveyor to the Vestry, as a mark of respect and gratitude for the interest he has always taken in their welfare, and especially in the origination of the Sick and Accident Fund, which has recently received the sanction of the Vestry. Whilst expressing sincere regret at his retirement from Chelsea, they earnestly hope that future prosperity and success will attend all his undertakings, and that wherever duty may lead, or in whatever circle of friends he may be placed, he may find the same kindly feelings of regard and esteem shown him as in the humble but heartfelt good wishes of the workmen of the Vestry of Chelsea."

Hornsey.—At the meeting of the Hornsey Local Board, on the 15th inst., the Chairman moved that the salary of the Surveyor, Mr. T. de Courcy Meade, be raised 100*l.* a year from July 1, that his salary should be increased 50*l.* a year from the 1st of next July, and 50*l.* a year the following July, making in all 700*l.* a year." The chairman spoke in highly-eulogistic terms of the value of Mr. Meade's services in connexion with the Board and district, and the motion was adopted.

Leicester.—At the meeting of the Leicester Town Council, on the 17th inst., a letter was read from Mr. J. Gordon, the Borough Surveyor, resigning his appointment, consequent on his recent election as Chief Engineer to the County Council of London. The Mayor said that the duty of the Council would be to refer the matter to a committee, and he moved that the letter be referred to the Highway and Sewerage Committee and the chairmen of committees to report at the next meeting. The letter would be received with mingled feelings,—not altogether with regret, because they must rejoice that their friend Mr. Gordon had obtained what was termed, he believed, the blue riband of his profession. It was highly creditable to Mr. Gordon that he should have been the successful candidate for so important a position, and they were losing a very valuable official,—a man who, during the nine years he had been with them, had more than justified the expectations that were formed of him when he came. Mr. Gordon would be the first to admit that in Leicester he had found a broad and wide field for his work. They were just under the necessity of entering upon some very large undertakings, and that was an excellent opportunity for a man of Mr. Gordon's ability. They would part with him with the deepest regret, but they would always feel that it was a credit to Leicester that they ever had him as their Surveyor. Alderman Kempson seconded the motion, and it was agreed to.

Windsor.—At the last meeting of the Windsor Town Council, a resolution was passed that Mr. Thomas Vincent Davison, A.-M.I.C.E., the Borough Surveyor, be thanked for the services rendered by him during the period of the Royal Agricultural Show at Windsor, and that an honorarium of 10*l.* 10*s.* be awarded him for his services.

ARCHÆOLOGICAL SOCIETIES.

London and Middlesex Archæological Society.—The annual general meeting of this Society was held on the 18th inst., at the offices, 8, Dane's-inn, Strand. Colonel Britton occupied the chair, and the usual preliminary business having been transacted, the Chairman welcomed the members, and said they met altogether under very pleasant circumstances, as the Society was more than ever prosperous. They did not meet at these annual gatherings in large numbers; like all prosperous concerns, their members had every confidence in the management (hear, hear). Mr. T. Milbourn, the hon. sec., next read the report, of which the following is an abstract: The Council, in presenting the thirty-fourth annual report, had again the pleasure of congratulating the members on the continued prosperity of the Society. The work done by them since the last meeting was not so large as desired, but this had occurred through a want of material for evening meetings. The report then gave a list of the various churches visited, with a description of the same, thanks being given to Mr. Stephens, M.P., Dr. Freshfield, Major Lambert, and others for their kindness to the representatives of the Society on various occasions. The general meeting held at Edmonton, East Barnet, and Finchley, on July 26, 1888, proved most successful. This meeting was presided over by Mr. J. W. Butterworth, F.S.A., who had most generously erected a monument in Edmonton Church to the memory of Charles Lamb and William Cowper, to commemorate the visit of the Society. The thanks of the Society were due to the Rev. R. S. Gregory, vicar of Edmonton, for his paper on the history of the church; also to Mr. E. W. Brabrook, F.S.A.; thanks were also due to Mr. S. W. Kershaw, F.S.A., for his paper on East Barnet church; and to the vicar of East Barnet for his reception of the Society, and his remarks on the church; and to Major George Lambert, F.S.A., for his description of Finchley parish church. During the season an evening meeting was held at the Mercers' Hall, by the kind permission of the Master and Wardens, Mr. Howley Palmer occupying the chair. Dr. Freshfield addressed the meeting. The thanks of the society were due to Mr. John Watney, F.S.A., for getting permission to meet in the Mercers' Hall; also for his paper on "The History of St. Thomas of Acons, and on the Plate of the Company." The thanks of the Society were due to the Mercers for their hospitality on the occasion. The annual excursion of the London and Middlesex Archæological Society will take place on August 15, at Colchester. The number of members is:—Honorary, 4; life, 36; annual, 155. On the motion of the Chairman, seconded by Mr. Pitman, the report was adopted. The officers having been re-appointed, the proceedings terminated with an acknowledgment of the services of the chairman.

Surrey Archæological Society.—Respecting the notice of this Society which appeared in the *Builder* of last week, the excursion

announced for Thursday has been postponed, in consequence of the sudden death of Mr. Ronald Leveson-Gower.

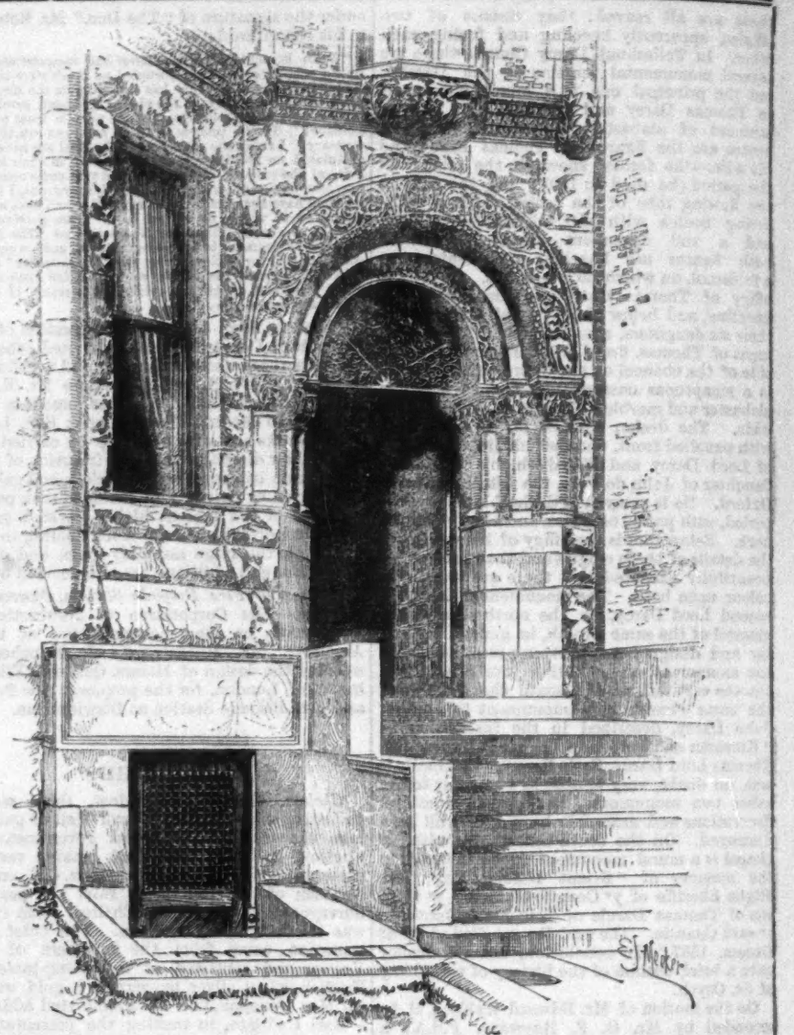
THE LONDON COUNTY COUNCIL.

THE weekly meeting of this Council was held on Tuesday last in the Council Chamber of the Corporation of London, Guildhall, Lord Rosebery in the chair.

The Question of a Council-Chamber.—The Chairman, on taking his seat, reported that that was the last day on which the Council could meet at the Guildhall, as the Council Chamber was about to be repaired or redecorated. There would then be an interval of two months, and the Council would have to decide in the meantime where they would meet after that date. He did not think that the room at Spring-gardens would be ready by that time. It was agreed that the next two meetings be held at Spring-gardens, that a vote of thanks be accorded to the Corporation for the use of the Council Chamber during the past three months, and that the Chairman be authorised to apply to the Lord Mayor for permission to continue to meet there after the necessary repairs were completed. Later on in the sitting, the Council Chamber and Offices Committee brought up the following report:—"Your Committee have to report that, under the authority conferred upon them by the resolution of the Council on the 9th instant, they are having bills of quantities prepared with a view to obtaining tenders for the carrying-out of the proposed alterations to the present Council Chamber and Offices at Spring-gardens. An advertisement has been issued inviting tenders for the work, and the time fixed for the receipt of the tenders is Monday, the 29th instant. According to the standing orders, the tenders should be opened by the Council; but if this course were pursued there would not be sufficient time before the 2nd August, the date on which the Council has resolved to adjourn for the summer vacation, for the Committee to meet to consider the tenders and to report to the Council as to the acceptance of one of them, and for the Council at a subsequent meeting to seal the contract. In order to obviate this difficulty it will be necessary for the standing order relating to the opening of tenders over 500*l.*, to be suspended, and for the Council to authorise the Committee to open and consider the tenders at a special Committee meeting on Monday, the 29th, and report their decision to the Council on the following day, Tuesday, the 30th. By this means, on the Council's approving the recommendation of the Committee, the contract could be sealed at the meeting of the Council on the following Friday, August 2. Your Committee accordingly recommend—

'That Standing Order No. 176, relating to the opening of tenders, be suspended to enable the Committee to open the tenders at a special meeting on the 29th inst., and that the Committee be authorised to bring up a report as to the acceptance of one of them at the meeting of the Council on the following day.'"

The Corporate Associations (Property) Bill.—The Corporate Property, Charities, and Endowments Committee presented the following report:—"Acting on the reference made by the Council on June 21, 1889 (No. 3), we have examined the Corporate Associations (Property) Bill. From the language of the Bill it is not very easy to say what associations are affected by it, but it affects all corporations established for the advancement of commerce, of religion, of the interests of certain trades, or for any other purpose not being the purpose of trading for profit. We conceive that this description includes, and is intended to include, the City Guilds, and, applying its provisions to that important class of corporations, we look to see what result they will bring out. It provides that the property belonging to such bodies shall be held on trust for the members for the time being and their successors; and it leaves any one of them at liberty to dissolve, and to divide that property among its members on condition of its satisfying one of her Majesty's Superior Courts, 'that by reason of its objects or the shortness of the time during which it has been established the members for the time being are justified in dissolving the same, and in dividing the property or the proceeds thereof among themselves.' That condition seems to us easy to satisfy, seeing that to a great extent the objects of the Guilds are extinct, and the property they hold is not wanted for those objects. The view lately presented to the Council, and as we conceive accepted by it, was that the Guilds are public bodies, holding property for purposes public in their nature, though the law has not recognised those purposes as enforcable; that there are at all events large portions of their property to the enjoyment of which their individual members are not justly entitled; and that owing to great social changes, Londoners at large are justly entitled to share in that enjoyment. But if this Bill passes into law, it will create a right in the members of the Guilds at least to enjoy the whole income of the Guild property for ever, and probably to divide the corpus. There is no memorandum attached to the Bill for the purpose of explaining its principles or objects. In the absence of such explanation, its principles appear to run counter to those recently adopted by the Council as applicable to the Guilds. With regard to other Associations, we do not know enough of the nature or circumstances of such as may be contemplated, to judge whether the effect on them may be more beneficial. Probably the Bill will be supported by the members of Guilds. We cannot advise the Council to take any action upon it. We merely recommend 'That a copy of this report be sent to the gentlemen whose names are on the back of the Bill.'" This was agreed to after a short discussion.



American Street Architecture: House at Boston.—Messrs. Cabot & Chandler, Architects.

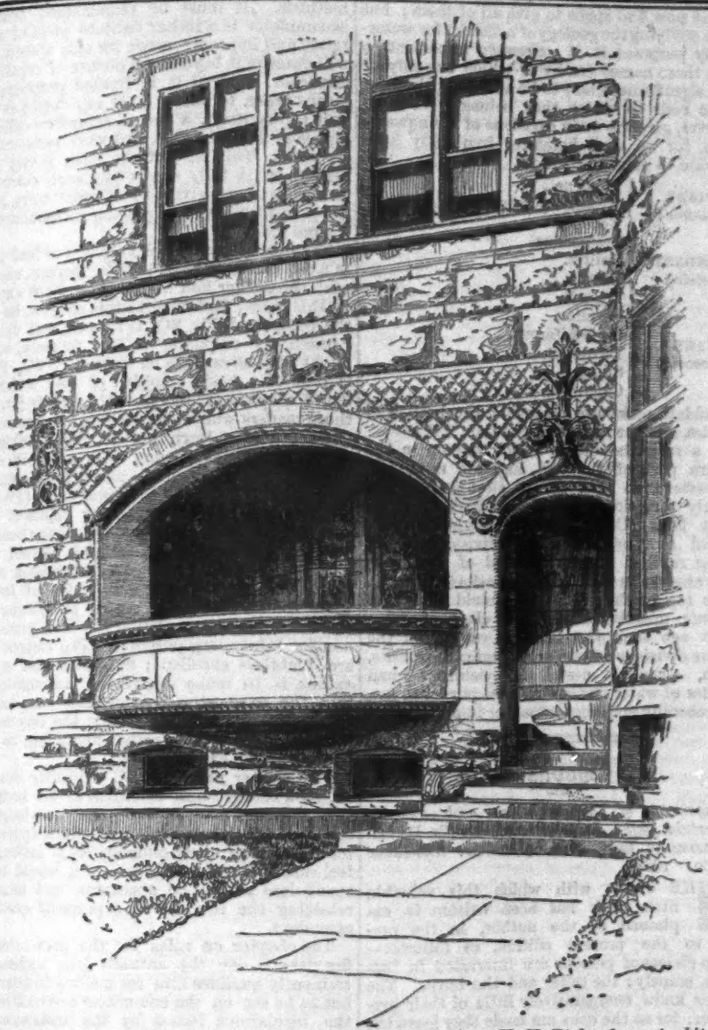
The Housing of the Working Classes.—The report of the Committee on the Housing of the Working Classes contained the following paragraphs:—

"The attention of your Committee has been directed to the vacant land adjoining Battersea Park, and to its eligibility for the purpose of the erection of dwellings for the working classes. The estate, which the late Metropolitan Board of Works declined to acquire when the park was transferred under the Public Parks and Works Act, 1887, is valued by the Crown officials at 156,530*l.*; and the debt upon it, with the accumulated arrears of interest, amounts to about 180,000*l.* Your Committee instructed the Clerk to communicate with the First Commissioner of Works with the view of ascertaining whether he would be willing to sanction the erection of improved dwellings for the working-classes in Prince of Wales-road, if such a proposal should be made to him by the Council. In reply, the First Commissioner states that the Department would be unable to entertain any such proposal, as the leases of the neighbouring houses contain restrictive covenants against carrying on any trade or business, and they were erected with the distinct understanding that houses of a superior class would be built upon the adjoining land. Your Committee report the facts for the information of the Council.

"Your Committee reported to the Council, on March 12, that the late Metropolitan Board had received official representations under the Artizans' Dwellings Act, 1875, relating to eight unhealthy areas, upon which no decision had been arrived at by the Board. One of these related to an area adjoining Bell-lane, Whitechapel, to which the attention of the Board was repeatedly called by the Secretary of State for the Home Department, the Whitechapel District Board of Works, the Whitechapel Board of Guardians, the Board of Guardians for the relief of the Jewish Poor, and others. The area was described in 1877 by the Medical Officer for Whitechapel as having a population of about 2,307, with 8·6 square yards to each person, but the present Medical Officer of the district states that the numbers have fallen to 2,140. The inhabitants are for the most part of the Jewish persuasion—many of them foreigners—and the courts and alleys are densely populated. Your Committee appointed a Sub-Committee to consider the condition of the locality, and they have made a thorough inspection of the area, and will shortly present a definite report.

"The Council, on the 25th ult., adopted a suggestion made by your Committee that the Home Secretary should be requested to assent to the appointment of Mr. Shirley F. Murphy, the Medical Officer to the Council, to be the Medical Officer under Section 13 of the Artisans' Dwellings Act, 1875. Your Committee have now to report that the Secretary of State has signified his assent to the appointment, and they are advised by the Solicitor that no further resolution of the Council is required."

Gates and Bars.—The Parliamentary Committee brought up the following report and recommendation:—"On May 21 last it was referred to your Committee to take steps to obtain the necessary powers for the Council to remove all bars, gates, and other obstructions now existing in the London streets and thoroughfares. On a full consideration of the matter, however, it appeared to your Committee that a Bill to remove all bars, &c., would be met with very extensive opposition, and be attended with very heavy costs, whereas if a Bill were framed to deal with a few gates or bars only, the question of compensation, and similar questions, would probably be decided at a more moderate expense. Your Committee have accordingly selected four test cases on two different properties, which they think would be suitable for the purpose. The obstructions referred to are situate in Torrington-place, Gordon-street, Upper Woburn-place, and Regent-place, leading out of Regent-square. As the reference by the Council relates to *all* bars, &c., it is neces-



American Street Architecture: House at Albany.—The late H. H. Richardson, Architect.

sary for your Committee to ask for fresh instructions, and they recommend—

"That it be referred to them to take steps for the removal of the bars above mentioned, by a Bill to be introduced in the next session of Parliament."'

This was agreed to, and after discussing other matters the Council adjourned.

AMERICAN STREET ARCHITECTURE.

We publish two examples of entrance fronts to American street residences, one in Boston, from the designs of Messrs. Cabot & Chandler; the other in Albany, designed by the late H. H. Richardson.

The Boston house is a curiously frank example of the adoption of Byzantine forms of detail in modern American architecture.

CASES UNDER THE METROPOLITAN BUILDING ACT.

A Greenhouse a Building.

At the Dalston Police-court, before Mr. Bros, Mr. Oldis, of Finsbury Park, was summoned by Mr. H. Lovegrove, District Surveyor of South Islington, for erecting a greenhouse addition in rear of a house in Highbury Quadrant.

The defendant pleaded that as he had not built any walls the structure was not a building.

The District Surveyor pointed out that only the necessary woodwork of sashes was exempt, and that he required the enclosure up to sills and the whole of the side next to the adjoining premises to be of brick.

The magistrates decided that the structure was a building, and imposed a small penalty and costs.

Surveyor's Fees.

Mr. T. Quinn was summoned at the Clerkenwell Police-court, by Mr. H. Lovegrove, District Surveyor for South Islington, before Mr. Corser, for non-payment of fees on some blocks of model dwellings at Canonbury. There was no defence, and the magistrate ordered payment in fourteen days, with costs.

THE ERECTION OF FLATS.

SIR,—Mr. T. E. Knightley, the District Surveyor for Hammersmith, having, on the question of fees, been unsuccessful in his contention that each "flat" in buildings under 3,600 square feet in area is a separate building, states, in the *Builder* of the 13th inst., that, "as the law is against him, the public will have to run the risk of cremation, or decimation by epidemics."

Will you allow me to assure the public that Mr. Knightley's predictions are absolutely groundless.

It is well known that in the "dwellings," or small "flats," occupied by the working classes, the fire risk is greatly increased by the use of oil-lamps, &c.; but, notwithstanding this, the cases are almost *nil*, and there is no instance on record of a fire arising in these "flats" having spread to an adjoining tenement; while, with respect to epidemics, notwithstanding theories to the contrary, there appears to be less risk to the residents in "flats" than to the occupiers of ordinary houses.

In proof of this I will quote from the records kept by Sir Sydney Waterlow's Industrial Dwellings Society, of which I have the honour to be Secretary. The Society has, in various parts of London, erected nearly 5,000 small "flats," at a cost, in round figures, of 1,000,000*l.*, and houses nearly 30,000 persons of the working or labouring classes. The ceilings in nearly all the rooms are constructed with the usual lath-and-plaster on wood joists, some of the buildings being divided at the second or third floor by fireproof materials. During a period of twenty-six years the claims for fires arising in these "flats" have been twenty-eight only, and the cost of reinstatement has averaged less than 5*l.* each claim.

During the like period the records show no cases of infectious diseases having spread from floor to floor or from block to block, while the death-rate from these diseases is nearly 25 per cent. below that for the Metropolis generally. In the past year no death from zymotic disease occurred at eighteen out of the thirty-five estates in occupation, and the few deaths at the other estates were chiefly from infantile diarrhœa, measles, and whooping-cough.

JAMES MOORE.

34, Finsbury-circus, E.C., *July* 18.

EXAMINATIONS FOR FOREMEN AND CLERKS OF WORKS.

SIR,—Professor Roger Smith, in his letter in your last issue, drew the attention of mechanics desirous of qualifying themselves for the position of foremen and clerks of works to the advantages offered by the examination conducted by the Carpenters' Company. The thoroughly practical and comprehensive range of the subjects set, and the certificates awarded by the eminent professional gentlemen who conduct the examination, are a sufficient guarantee that the successful candidates are well qualified for the positions. Qualification and prospect of appointment do not, however, always go hand-in-hand. Unless a man has influence, it is too often the case that talent, skill, and ability go to the wall. When vacancies occur in private firms, or in connection with Vestries, &c., it is not usually the best-qualified applicant, but the one who has friends who can exert influence, who succeeds. The Civil Service examination for Clerks of Works is so hedged in by restrictions that not one of the men who have passed the recent severe tests are qualified to compete, for the simple reason that although fully competent, they have not had influence to secure and hold a similar position for five years. I consider it a gross injustice that men who by many years of earnest work and patient study have acquired sufficient knowledge to pass such an examination should be thus debarred, and so have no incentive held out for further study. Why should not a Government professedly desirous of furthering technical education give an impetus to such studies, by placing this examination on the same footing as those for the Customs and Excise? Instead of having a prohibitive fee of 3*l.* and the other unjust restrictions, abolish the same, and encourage artisans to compete by fixing a fee of 5*s.*, and allow all mechanics who have served their time at a trade, and hold certificates in Building Construction and Technology, and who can pass an examination in practical and technical work similar to that set recently by the Carpenters' Company, to compete at the Civil Service examinations. I also hope that public bodies, such as the School Board and the County Council, will fill up positions by public competition open to all qualified men.

A free field and no favour is all that is desired. If such reforms are carried out they will do more to advance technical education than any number of speeches and Acts of Parliament.

A CERTIFICATED FOREMAN CARPENTER.

July 24, 1889.

The Student's Column.

WATER-SUPPLY.—IV.

AQUEOUS ROCKS.

THE rocks composing the earth's crust are divided into four groups (1) *aqueous*, which have been formed or laid down in water; (2) *æolian*, deposited on the land surface after having been wafted about by wind; (3) *igneous*, formed through the agency of heat, and having at least once been in a state of fusion and subsequently cooled down; and (4) *metamorphic*, either of the foregoing modified, or altered by heat in various forms.

We will first say something about aqueous rocks. They comprise *arenaceous* beds, such as sand, sandstone, and grit; *argillaceous*, which include clays of all kinds; and *calcareous*, such as limestone. Their origin is comparable with beds of a like nature forming at the present day on the sea-bottom, in estuaries and rivers. Generally speaking, the arenaceous beds at present in process of formation in the sea, are found on, and in, the vicinity of the shore, commencing with the pebbles and gravel on the beach, passing into grit and coarse sand, and eventually, some little distance out at sea, ending in very fine sand mixed with a slight quantity of clay. The argillaceous beds begin where the arenaceous leave off, at first with sandy clay, which becomes more pure as it recedes from the coast-line, and then it thins out or dies away. This mode of deposition is liable to variation through the comparative absence of materials or the presence of currents, sand-banks, &c., but the principle remains the same.

The student will understand that the materials laid down are derived from the land, and it entirely depends on the transporting power of the water as to their arrangement;

the heavier portions are, therefore, naturally found congregated nearest the place of derivation, and the lightest farthest from it, and by successive accumulations, in time the deposits, especially of the finer materials, become hundreds of feet thick. During this process, animals (or their remains) living in the sea, are covered up by, and entombed in, the sediment. Where the sediment derived from the shore dies out, successive generations of shell-fish, corals, foraminifera, &c., accumulating one above the other on the sea-floor, form thick deposits of organic remains, which, as they become compact, are known as limestones. Limestones, however, are chemically formed also from the precipitation of lime present in great quantity in water, &c.

We know that the relative positions of land and water are ever changing,—even within the historic period we have the clearest proofs of it,—and precisely the same thing has happened over and over again in past geologic epochs, so that what was once the sea-floor is now elevated into dry land, and *vice versâ*. This leads us to observe that the sedimentary rocks in quarries and cuttings yield the remains of organisms (fossils) which flourished in the water at the time the particular deposits examined were laid down, and, if these are carefully studied, it will be seen that each deposit is characterised by a different *suite* of fossils. The value of this fact is enormous, as it enables us to trace the continuity of deposits over large tracts of country, either at the surface, or when met with at a depth in well-borings. This, as we shall see, is a matter of considerable importance in water-supply questions. If we follow up a series of beds, and map them wherever they *outcrop* (come to the surface), we find that there is a definite order of succession. Commencing with the youngest beds, as proved by the great similarity of their contained fossil species to recent ones, we see that they lie on others which must, under ordinary circumstances, be older; that these older beds are again underlaid by others of greater antiquity, and so on, until we arrive at the oldest known deposit, the fossils in which are totally different from the forms now inhabiting our shores, and we observe that the change in the fossils, from comparatively modern formations to the most ancient forms, is exceedingly gradual, as exemplified by those found in all the intermediate deposits.

Another thing that immediately strikes us is that each bed, or definite horizon, is very changeable in regard to its thickness when traced over large areas, frequently thinning out altogether, dislocations and bendings of the strata are observed, and numerous other phenomena, all of which relating to our subject will be subsequently explained more in detail. Suffice it now to say that the practical application is very direct. A water-bearing bed can, of course, only be drawn upon where it exists. If it thins out, there is an end of the supply. A town may derive its water from a bed which only exists locally; a few miles off, that bed may have disappeared, and the water as well. How often has the ignorance of this fact led to waste expenditure in sinking wells! The character and distribution of a water-bearing deposit should be studied quite as assiduously as the miner does the whereabouts and modes of occurrence of the precious minerals.

Suppose a water-bearing bed changes its lithological character (structure), as it frequently does,—such, for instance, as the gradual alteration of a sand into a clay, caused in some such a manner as explained in the earlier part of this article,—it will often be found to give out less and less water as the change is traced up, so that the same deposit may be aquiferous (water-bearing) at one place and quite barren in another.

Again, in predicting the water-bearing qualities of an aqueous rock, we must study its horizon with reference to the water-level of the district. It is quite possible for a bed to be of very regular structure, persistent over a wide area, and a good water-bearer, but the hydrological conditions may not be the same throughout. Perchance the bed may almost imperceptibly dip, which, even though the water-level may be tolerably constant, carries it above the line of permanent saturation, and is thus deprived of its water. Or, conversely, it, although water-bearing, may dip too deeply into the ground to render it practicable to draw upon the supply.

In order to identify the various beds, each deposit has received a distinctive name. We cannot now find space to give all of them; but when studying the geology of a district for water-supply purposes it is extremely important to learn these names (many of which are only of local significance), and to be able to apply them to the beds to which they belong. We may, however, give the main divisions of the aqueous rocks, for we shall hereafter frequently have occasion to refer to them:—

TERTIARY (*Cainozoic*)	Pliocene.
	Miocene (absent in England).
	Eocene.
SECONDARY (*Mesozoic*)	Cretaceous.
	Oolitic.
	Liassic.
	Triassic.
PRIMARY (*Palæozoic*)	Permian.
	Carboniferous.
	Devonian.
	Silurian.
	Cambrian.

The oldest rocks are placed at the bottom of this list, and the newest at the top.

As a rule, the oldest rocks outcrop in the western part of England, and the newest in the eastern, so that if we start in a south-easterly direction from North Wales, in the oldest beds (Cambrian) we might pass in upward succession all the divisions, until, having reached the eastern end of Essex, we find ourselves in the newest deposits (Pliocene), at the top of the list. We should encounter *en route* gravels, sands, and clays of more recent age than the Pliocene resting on the various divisions; these are superficial deposits, which, although useful as yielding small supplies of water for agricultural purposes, &c., are, generally speaking, of minor importance.

Books.

Management of Accumulators and Private Electric Light Installations. By Sir DAVID SALOMONS, Bart., M.A. (London: Whittaker & Co. 1888.)

THE object with which this valuable little book has been written is explained by the author, in the preface to the present edition, as follows:—"Two classes of persons are interested in batteries, namely: the seller and the buyer. The former know comparatively little of their properties; for as the cells are made they leave the works, and their knowledge is confined to laboratory tests, and it is not to their interest to publish all their shortcomings. The user, on the other hand, has rarely the knowledge to examine the question; it therefore remains the privilege of a very few to observe, scientifically as well as practically, the working of batteries, and out of this limited class not many have the time or opportunity to write on the subject; the Author has attempted to fill the gap which lies between the manufacturer of cells and the general user, and trusts it will prove of benefit to both."

Thus, the position the author holds in the electric lighting world is a unique one; he may be described as a professional user. Sir David Salomons first used the electric light at Broomhill in 1874, and whatever criticism may be offered as to the various arrangements employed in the present installation, probably the most complete of its kind in existence, the mere record of the experiences gained after fifteen years' close observation of electric-lighting plant cannot be otherwise than of great value, alike to amateur and professional electricians.

After a brief description of the secondary batteries most generally used, instructions are given for setting up an accumulator, care being taken that each cell shall be easily accessible for inspection and repair; the faults that may develop before and after charging, and the precautions that should be taken at every stage are clearly set forth. Unfortunately this part of the text is by no means free from typographical errors, and although most of them are obvious enough, still such a one as occurs on p. 39, where $Pb\ O_4$ appears for $Pb\ O_2$, is likely to lead to confusion in the mind of a reader not familiar with the chemistry of lead cells. The chapter on "Failures: their causes and remedies," should be carefully read by everyone owning or having charge of accumulators; the symptoms of decay, and the directions as to how any faults that develop may be remedied are very clearly described, and the author's long experience is sufficient guarantee for the efficiency of his methods. It must be remembered that an accumulator is a rather delicate piece of apparatus, and improper usage for only a short time will damage it beyond all chance of repair; on the other hand, if it is treated properly, and means taken to make good any defect as soon as it shows itself, a set of secondary cells will give very little trouble, and work satisfactorily for years. This part of the book is very interesting, as it fully shows why such contradictory reports are given, by different users, about the practicability of employing accumulators on a large scale.

The precise part which sulphate of lead plays in a cell is, we believe, still in dispute, and we wish the author had been a little more explicit on this point. Referring to this subject, he says the compound $Pb_2\ SO_5$ is formed, and calls it "unhealthy sulphate." This formula, which might with advantage be written $Pb\ SO_4.\ Pb\ O$, is that of a basic sulphate of lead, which, no doubt, may occur; but it would greatly interest those readers who wish to follow these scientific explanations, to learn how Sir David Salomons made sure he was dealing with a definite compound, and not a mere mixture of ordinary sulphate ($Pb\ SO_4$) and the lower oxide ($Pb\ O$).

Indeed, there are very many points of considerable interest raised throughout the book on which a little fuller explanation is needed.

The second and larger part of the book deals with installation work, and states at length what is necessary to make everything go smoothly, not even omitting the best grease to use for lubricating purposes. The suggestions are doubtless excellent; but as the aim of the author is to make everything automatic, so that the most stupid attendant can hardly make the light unsatisfactory, the amount of apparatus required is rather appalling, to say nothing of the expense.

The master of Broomhill evidently devotes no little thought and attention to his installation, but few owners have the knowledge or can spare the time to design automatic apparatus for overcoming every difficulty as it arises; we feel sure a better plan, as a rule, would be to spend less money on apparatus, and more in retaining the services of a properly qualified attendant.

The chapter on rules for the prevention of fire risks is one the author's long experience eminently qualifies him for making instructive, but as he sat on the committee responsible for the regulations issued by the Institution of Electrical Engineers, he merely reprints them, not feeling himself in a position to offer any comments.

The table of estimates has evidently been very carefully compiled, and will prove of great service to any person wishing to have a private installation.

One addition to the book would be of immense assistance to the young student of physical science. In the index of terms there occurs this sentence, "Watt = volt × Ampère = Measure of force or energy." Taking the dyne and the erg as the measures of force and energy respectively, will the author state how many dynes there are in an erg, how many ergs there are in a watt, and how many watts there are in a dyne?

The book will well repay careful perusal, and it contains a vast amount of information that is to be found nowhere else in so simple and readable a form.

Electrical Instrument Making for Amateurs. By R. S. BOTTONE. (London: Whittaker & Co. 1888.)

THERE is no better method of teaching a beginner the elements of any branch of experimental physics than by encouraging him to make with his own hands some of the simpler instruments required for demonstration, and letting him carry out certain well-selected experiments for himself.

This is essentially a book for schoolboys who wish to know something about electricity, and the list of tools required, given on the first page, should be well within the easy reach even of those not overburdened with pocket-money.

The first part of this useful little work gives most careful and detailed instructions for making electroscopes, Leyden jars, a Coulomb's torsion balance, an electrophorus, and five different kinds of electrical machines. Every operation is so described as only to require the tools previously named, except in a few cases, such as for example the Wimshurst machine, where the use of a lathe is suggested, a tool the author says in the earlier pages he does not

expect the amateur to possess, and a boy endowed with some little patience and ingenuity should find no difficulty in producing the instruments according to the instructions given. Perhaps the young amateur would find himself in possession of a more useful set of apparatus had the construction of some other instruments been given in place of the less efficient forms of electrical machines, but a lad who had acquired sufficient skill to construct a workable Holtz or Wimshurst machine would, doubtless, be able to devise for himself ways of reproducing some of the instruments illustrated in elementary treatises on electricity and magnetism, or to be seen in the shop-windows of philosophical instrument-makers.

The second part of the book, describing "dynamic or current instruments," shows a sad falling-off, and is very inferior to the first portion. The author, beginning with medical and induction coils, carries the student as far as the construction of the frame-work, the core, and the winding of the primary and secondary coils. The contact-breaker is merely mentioned, so we presume the author means it to be bought ready-made; but this is no reason why the various connections should be omitted from the diagrams, and no proper description given in the text. At this stage the amateur is apparently supposed to become possessed of an excellent stock of tools, and be as good a workman as the average mechanic; this being so, he can construct two forms of small magneto-machines. Next follows a paragraph headed "The Dynamo." This is introduced, presumably, to draw attention to the fact that the author has written a book called "The Dynamo: How made and how used," for beyond getting the frame and field magnets cast for an antiquated form of Gramme machine, we defy the ablest amateur to construct a dynamo from the description given. The rules laid down for designing a dynamo to do any particular kind of work are two in number and are simplicity itself; the length of wire on the armature is determined by allowing 1 yard for each volt required, the cross-section is calculated by allowing 2,000 ampères per square inch of cross-section. And yet electrical engineers require years of study and training before they can successfully design dynamo machines!

The forms suggested of ammeter, voltmeter, and galvanometers are practicable, but the directions given for graduating these instruments are essentially amateurish; for example, to find the deflection given by one ampère on the ammeter, ten quart Daniell cells are connected up with the ammeter and a copper-depositing cell, the experimenter then adjusts matters until exactly 18·35 grains of copper are deposited in one hour. If the author has ever graduated an ammeter accurately in the way he describes, he must be the most skilful of living experimenters.

In the section on voltmeters, the author says, "I shall deviate somewhat from the plan hitherto followed in these pages, and devote a few lines to the consideration of what E. M. F. really is. According to the present state of our knowledge, the phenomena which we group together under the name of 'electricity' are simply manifestations of a peculiar mode of motion in the ultimate particles of bodies, called *atoms*." Having enumerated "many means of setting up this motion," the following words describe what E. M. F. really is: "Now the means employed, whether they be friction, motion in the field of a magnet, chemical action, or heat, are called, when viewed under this aspect, 'electro-motive force,' or that which sets up an electrical condition." This is a fair example of the author's "theory" which is scattered about the latter part of the book, though, fortunately, he partially returns to his old style when dealing with batteries, thermo-piles, and the telephone.

So long as Mr. Bottone is describing to the amateur how to make rough but practicable instruments, his style and methods are excellent in every way; but he would have done well had he submitted the theoretical parts of his otherwise valuable little book to the candid criticism of some competent electrician.

The Marble Church at Copenhagen.—The exterior of the great marble church at Copenhagen, upon which work has been in progress for several years, is somewhat approaching completion, the four huge marble columns forming part of the frontage towards Bredgade being now in course of erection.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

10,343, Combination Mantel and Chimney-pieces, &c. J. R. Croathwaite.

The object of this invention is to form side-plates of iron, which shall make a framework for tiles which are freely employed in the decoration. When the tiles are fitted, the joints of the tiling are utilised, strengthening pieces being employed crossing the framework. Special forms are also used in the construction of the lintel and jambs, by which tiles or other ornamental work can be introduced on the iron framework.

10,586, Paving. A. McLean.

In the paving-blocks which are the subject of this invention, made of cement or concrete, rings, strips, or small blocks of lead are inserted so that they lie flush with the wearing surface. The invention is also applicable to asphalte, and will prevent the paving from wearing out so soon.

4,174, Burglar-proof Fastenings for Windows. F. T. Vine, B.A.

The object of this invention is to secure the window so that it may not be undone by a burglar or thief from the outside, even if the person should break a pane of glass which is not of sufficient size to admit the body. To each of the lower and upper sashes of the window a strong chain or jointed metal bar is fixed so that the same cannot be unfastened, the other end of the chain being attached by any suitable detachable fastener to the interior wall of the room at such a distance that it cannot be reached by an arm passed through the window or a broken pane. The chain will also permit of the window being opened to allow a certain amount of ventilation.

5,312, Chimney-top. T. Jutin.

In this invention a chimney-top, or terminal of iron, or of fire-clay and iron is used. The fire-clay portion is a pipe of from 4 ft. to 6 ft. long, and from 9 in. to 12 in. in diameter, with a broad flange on the top to hold the windguard, which is attached by bolts and nuts. This windguard, which is a part of the invention, has circular louvres, fitted about an inch apart, the whole being removable when necessary.

5,783, Opening, Regulating, and Fastening Windows, &c. R. Adams.

This invention bears reference to a previous specification, and relates to opening, &c., windows and analogous articles in groups, or singly, by the use of a serrated rack, a lever, and a look-fastening.

7,164, Chimney-pot and Fixing. J. Kimm.

The object of this patent is to prevent danger from the chimney-tops or pots being blown down and damaging the roofs, &c., or of falling on and wounding the passengers below. The pots are set outside the bricks or stones of the chimney, and secured, or collared, with mortar or cement in the ordinary way. The pot is constructed with a collar, or base, the outer edge and bottom being made flat so as to rest on the top of the bricks, and forming a right angle with the base, which is inserted inside the chimney. When set in this way the pot will be absolutely immovable in a gale of wind.

NEW APPLICATIONS FOR PATENTS.

July 8.—10,969, C. Hearn, Mill for Grinding Wet Slurry.—10,977, F. MacGauran, Gate-fittings.—10,979, H. Munday and H. Walker, Flap Valves for Sewers or Drains.—10,986, C. Brown, Grip Hinge for Swing Frames.

July 9.—10,997, J. King, Material for the Treatment of Walls, &c.—11,036, H. Tucker, Fastener for Windows.—11,047, L. Williams, Window-sash Fasteners.—11,052, F. Trabert, Centering Supports for Arched Constructions.

July 10.—11,117, J. Fryer, Extracting Cowl or Ventilator.—11,128, G. Batchelor, Drying Slurry by the Waste Heat from Cement Kilns.

July 11.—11,145, H. Johnson and T. Wilson, Air-inlet Ventilator to fit in Sash Windows.—11,146, H. Johnson and T. Wilson, Exhaust Ventilators for Chimney-flues.—11,190, T. Descon, Preventing Sliding Window-sashes from being opened from the exterior side beyond a given point.

July 12.—11,221, R. Davies, Brick Presses.—11,239, F. Taylor, Nails or Fasteners.

July 13.—11,224, J. Kaye, Securing Casement-windows, &c.—11,252, H. Trimby Self, Countersinking Screw for Wood.—11,258, F. Baker and W. Totlow, Automatic Door.—11,281, J. Dean, Water-closets.

PROVISIONAL SPECIFICATIONS ACCEPTED.

15, W. Bird, Attaching Door Knobs to Spindles.—8,051, W. Scott, Paper-hangings, &c.—8,132, B. Cordingley, Plug-cock for Lavatories, &c.—8,532, O. Elphick, Lavatories.—8,625 J. Redpath, Cooking-ranges or Fireplaces.—8,852, F. Brown, Covering Floors, Walls, &c., in Wood, Mosaic, or Parquetry Work, for Imitations of Same.—9,011, J. Downes, Chimney-top.—9,114, P. Stein, Double Latch-lock.—10,000, S. Deards, Glass-roofs and Skylights, and Metal Bars for Same.—10,088, The Broseley Tileries Company and J. Crump, Earthenware Quarries or Tiles.—10,156, J. Simple, Drain or Sewer-pipes.—10,378, C. Coops, Paving.—10,386, R. Kerr, Walls and Other Surfaces of Brick, &c.—10,531, T. Birnbaum, Gas Brackets, Chandeliers, &c.—10,562, H. Brockmann, Combined Garden Tile and Drain Pipe.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

10,456, J. Stevenson and S. Eddington, Mould for making and Pressing Bricks.—12,173, C. Young, Automatic Bolt for Double Doors.—12,192, T. Hargreaves, Safety Window Fastenings.—12,470, G. Falconar, Framing Sash Windows, Doors, or Shutters.—12,713, T. Sharples and H. Graham, Windows.—13,040, H. McKibbin, Window-frames or Sashes and Fasteners therefor.—13,059, W. Jarvis, Wall-blocks for Buildings.—13,170, J. Kaye, Opening and Closing Fanlights, &c.—13,319, A. Greg, Machine for Sawing Timber.—235, C. Johns, Cure of Smoky Chimneys.—964, C. Widwark, Cement.—6,915, G. Ewart and Others, Metal Roofing.—8,642, T. Caunt, Sash Window-frames and Means of Opening and Closing the Sashes.—9,000, E. Mann, Raising and Lowering Window Sashes, &c.

RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

JULY 9.—By SEDGWICK, SON, & WEALL.

Bushey—Fourteen plots of f. land £341

JULY 10.—By A. RICHARDS (at Edmonton).

Tottenham, Bruce-grove—Six plots of f. land 600
F. house and shop in High-road, r. £32 p.a. 510

JULY 12.—By Messrs. COBB (at Sittingbourne).

Sittingbourne, near—F. enclosures of land, 107a. 2r. 32p. 3,150
Filmer's Farm, 31a. 2r. 32p., f. 2,000

JULY 15.—By HERRING, SON, & DAW.

Dulwich—322, Friern-rd. 1,600

By W. & F. HOUGHTON.

Stratford—44 to 54, even, and 66, 68, and 70, Hotham-st., u.t. 81 yrs., g.r. £31. 10s., r. £152. 2s p.a. 685

By H. A. HENDERSON.

Clapton—46, Powell-rd., f., r. £17 p.a. 480

By T. CHAMPNESS.

Essex, Aldborough Hatch—White's Farm, 22a. 0r. 29p., f. 1,400
Ilford—Ilford Nursery and 4a. 2r. 16p., f. 1,140
Barkingside—Two enclosures of land, 7a. 0r. 14p., f. 325
Barking—7, Heath-st., u.t. 56 yrs., g.r. £3. 8s., r. £26 p.a. 100
Hackney—39 and 41, York-st., u.t. 35 yrs., g.r. £3. 12s., r. £48 p.a. 285

By HARDING & LOW.

St. Albans—The Kingsbury Brewery and thirty-two inns, public-houses, and beer-houses 24,100

By FOSTER & CRANFIELD.

Hexton—43, Pitfield-st., f., r. £80 p.a. 1,580
151 to 164 even, New North-rd., u.t. 37 yrs., g.r. £46, r. £199 p.a. 1,250
Ealing—1 and 15, Oxford-rd., u.t. 73 yrs., g.r. £14, r. £91 p.a. 740

JULY 16.—By H. SCRUTON.

Rochampton—1 to 20, Elizabeth-pl., f., r. £410 p.a. 4,550
Kensington—5, Stratford-rd., f., r. £65 p.a. 890

By A. CHANCELLOR.

Richmond, Kew-rd.—The residence called "Parkside," u.t. 81 yrs., g.r. £33. 10s. 1,950

By W. A. BLAKEMORE.

Westminster—33 and 34, Romney-st., f., o.r. £104. 880
Romford—8 to 13, Moores-pl., u.t. 86 yrs., g.r. £30, o.r. £38 15

By KING & CHASEMORE.

Sussex, Faygate—A f. cottage and 13a. 0r. 28p. ... 820
The Beeches and 8a. 0r. 4p., f. 1,600
Numerous enclosures of land, 176a. 2r. 38p., f. ... 5,750

By DENNEHAM, TEWSON & CO.

Notting-hill—107, Portland-rd., u.t. 60 yrs., g.r. £7 270
St. Pancras—20 to 26, Charrington-st., u.t. 37 yrs., g.r. £40, r. £173 1,670
1 to 6, Penryn-st., u.t. 61 yrs., g.r. £35. 10s., r. £190 2,380
12, 14, 17, and 18, Penryn-st., u.t. 61 yrs., g.r. £15. 10s., r. £134 1,110
12 and 13, Platt-st., u.t. 64 yrs., g.r. £6, r. £74 . 300
25 and 26, Medburn-st., u.t. 64 yrs., g.r. £5, r. £65 760
41, 42, 43, and 44, Goldington-st., u.t. 61 yrs., g.r. £22, r. £139 1,345
153 and 155, Pancras-rd., u.t. 56 yrs., g.r. £5s. 10s., r. £105 720
22 and 23, Drummond-crescent; and a block of stabling, u.t. 12 yrs., g.r. £80. 10s., r. £370 p.a. 1,180
Camden Town—45 and 47, Georgiana-st., u.t. 51 yrs., g.r. £16, r. £72 720
5 and 6, Canal-ter., u.t. 10 yrs., g.r. £14, r. £56. 10s. 120
L.g.r. of £20 p.a., u.t. 50 yrs. 310
L.g.r. of £47 p.a., u.t. 30 yrs., with short reversion to r. of £9 0 p.a. 1,710

By THURGOOD & MARTIN.

East Cowes—"Marcefield," with grounds, f. 1,100
St. John's Wood—42, Finchley-rd., u.t. 30 yrs., g.r. £16 2,300
Brondesbury—The residence known as "Coverdale," u.t. 68 yrs., g.r. £26, r. £130 p.a. 1,450
Wimbledon—201, Dumont-rd., u.t. 85 yrs., g.r. £6, r. £27 p.a. 215

By SEDGWICK, SON, & WEALL (at Watford).

Watford—64, Church-rd., f., r. £11. 14s. 160
Clarendon-rd.—A plot of f. land 300

JULY 17.—By TURNER, RUDGE, & TURNER.

Lingfield—The f. residence "Angleside," and 7a. 0r. 36p. 750
Two cottages, and 19a. 3r. 27p., of which 14 acres are l. and rest f., r. £33. 8s. p.a. 670
The f. cottage "Billhurst," and 1a. 1r., r. £12. 10s. p.a. 660

By M. HUBBARD.

Belgravia—32, South Eaton-pl., u.t. 25 yrs., g.r. £9, r. £75 p.a. 830

By H. GRIFFIN.

Battersea—53, 55, and 57, Alfred-st., with stabling, u.t. 60 yrs., g.r. £7, r. £117 p.a. 760

By FARRINGTON, ELLIS, & Co.

Richmond—15, Down-ter., f. 285

By FURBER, PRICE, & FURBER.
Pimlico—4, Whittaker-st., u.t. 32 yrs., g.r. £3, r. £45 p.a. £370

By ELLIS, MORRIS, SUTHERLAND, & Co.
Westminster—61, Lillington-st., u.t. 40 yrs., g.r. £5, r. £46 p.a. 500

By J. M. KLENCK & Co.
Deptford—30, Hyde-st., u.t. 27 yrs., g.r. £2. 8s., e.r. £24 120
Mile End—23, 25, to 29 and 31, Baythorne-st., u.t. 77 yrs., g.r. £37 1,660

By HORNE, SON, & EVERSFIELD.
Lower Clapton—13, Portland-pl., f., r. £55 560

By D. YOUNG.
Long Acre, Queen-st.—F.g.r. of £67. 10s., with reversion in 74 yrs. to e.r. of £300 p.a. 1,140
Clapham—26, Thornbury-rd., u.t. 92 yrs., g.r. £6. 10s., r. £36 p.a. 350

JULY 18.—By DYER, SON, & HILTON.
Regent's Park—48, Mornington-rd., u.t. 49 yrs., g.r. £5. 5s., r. £60 675
Camden-rd.—No. 64, u.t. 44yrs, g.r. £8, r. £60 p.a. 550
Lee—23, Blessington-rd., u.t. 63 yrs., g.r. £12, r. £65 p.a. 500
Greenwich—F.g.r. of £2. 2s., with reversion in 54 yrs. 47

By RUSHWORTH & STEVENS.
Seven Dials—16, Little Andrew-st., and 20, Great St. Andrew-st., f., r. £113 p.a. 2,100

By DEBENHAM, TEWSON, & Co.
Streatham—F.g.r. of £94. 10s., with reversion in 90 yrs. to e.r. of £250 2,450
Chelsea—27 and 29, Britten-st., f., r. £50 p.a. 570
Islington—375, Liverpool-rd., u.t. 19 yrs, g.r. £5, r. £35 p.a. 220
Lee—209, High-rd., u.t. 26 yrs., g.r. £4. 6s. 8d., r. £25 p.a. 200
Guildford, near—F. arable land, 3a. 0r. 2b. 180

By VENTOM, BULL, & COOPER.
Petersfield, Hants—Enclosures of f. land, 35a. 0r. 3p. 1,000
Brompton—42, 42a, b, and c, Fulham-rd., u.t. 24 yrs., g.r. £50, r. £160 p.a. 1,190
L.g.r. of £50, u.t. 24 yrs., at a g.r. of £8 p.a. 540

By E. STIMSON.
Battersea—13 and 15, Ursula-st., u.t. 68 yrs., g.r. £12, r. £73 p.a. 540
6, Octavia-st., and a l.g.r. of £6, u.t. 88 yrs., g.r. £12. r. £36 p.a. 285
54 and 55, Corruna-st., u.t. 55 yrs., g.r. £5, 10s., r. £62. 10s. p.a. 500
New Kent-rd.—41, Falmouth-rd., u.t. 19 yrs., g.r. £5. 5s., e.r. £42 260
Camberwell—38, Denmark-rd., f., e.r. £33 360

By PROTHEROE & MORRIS.
Barking, Cambridge-rd.—A plot of f. land 90

By H. J. BLISS & SONS.
Hackney—22 and 23, Florefield-rd., u.t. 67 yrs., g.r. £8, r. £49 p.a. 255
Bethnal-green—1, Auckland-rd., f., r. £36. 8s. p.a. 410
66, Chisenhale-rd., f., r. £30 420
69 to 70 even. Punderson-gardens, u.t. 94 yrs., g.r. £36., r. £180 p.a. 1,380
23a, 25 to 29 odd, Sewardstone-rd., u.t. 60 yrs., g.r. £9, £167. 8s. p.a. 1,300

By NEWSON & HARDING.
Green-lanes—18, 20, 21, 25, to 27, Brownswood-park, u.t. 70 yrs., g.r. £66 3,065
15, 17, 19, 27, 29, and 31, Queen's-rd., u.t. 70 yrs., g.r. £48 2,050
2, 4, 12, 14, 34, 36, 38, and 40, Queen's-rd., u.t. 70 yrs., g.r. £69 2,885
28 to 40 even, King's-rd., u.t. 70 yrs., g.r. £68 ... 2,790

By G. B. SMALLFIELD (at Weybridge).
Weybridge, High-st.—A plot of f. land 1,230
Addlestone—A plot of f. land on the "Park View Estate" 260

JULY 19.—By NEWSON & HARDING.
Highbury-grove—No. 22, f., r. £100 p.a. 1,450
Balls Pond—65, Queen Margaret's-grove, u.t. 60 yrs., g.r. £5. 10s., r. £36 p.a. 370
Hammersmith—32, The Grove, u.t. 80 yrs., g.r. £6. 5s., r. £46 p.a. 300
Kentish Town—14, Lismore-circus, u.t. 74 yrs., g.r. £6. 2s. 6d. 320

By C. & H. WHITE.
Clapham-rise—40, Kimberley-rd., u.t. 75 yrs., g.r. £6, r. £36 p.a. 275

By W. H. ILES.
West Hampstead—13 and 14, Achilles-rd., u.t. 95 yrs., g.r. £10. 18s., e.r. £72 740
Poplar—1 and 3, Southill-st., u.t. 67 yrs., g.r. £4, r. £44 p.a. 260

By W. J. NEWELL.
Deptford—3 and 4, Regent-st., f., r. £52 p.a. 320

By C. D. FIELD & SONS.
Mile End-rd.—Nos. 397 and 399, u.t. 15 yrs., g.r. £14 700
Deptford Bridge—A plot of f. land, area 4,745 ft. ... 1,620
Borough, Marshalsea-rd.—A plot of land, area 1,000 ft., let for 80 yrs. at £17 p.a.
A plot, area 1,908 ft., let at £32 p.a.
A plot, area 1,720 ft., let at £23 p.a.

By A. & A. FIELD.
Spitalfields—1 to 7, Rosetta-pl., f., r. £133 p.a. 1,635
30, 31, and 32, Sandy's-row, f., r. £156 p.a. 1,040
Mile End—1 and 3, St. Dunstan's-rd., u.t. 60 yrs., g.r. £7, r. £53 p.a. 280
East India-rd.—No. 21, f., r. £30 p.a. 855

[*Contractions used in this list.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; yd. for yard, &c.]

Knaresborough Sewage Disposal.—Mr. D. Balfour, M. Inst. C.E., Houghton-le-Spring, Durham, has been engaged by the Knaresborough Improvement Commissioners and Local Board to report on a scheme of sewage disposal for the town of Knaresborough.

MEETINGS.

SATURDAY, JULY 27.

Architectural Association.—Fifth vacation visit to Maidstone and Leeds Castle. (See advt. in last week's *Builder*.)

MONDAY, JULY 29.

British Archæological Association.—Opening meeting of Annual Congress, at Lincoln. (For programme, see *Builder* for July 20, p. 47.)

TUESDAY, JULY 30.

Society of Engineers.—Visit to the Outfall Sewage Precipitation Works at Crossness.

British Archæological Association.—Lincoln Congress (continued).

WEDNESDAY, JULY 31.

British Archæological Association.—Lincoln Congress (continued).

THURSDAY, AUGUST 1.

British Archæological Association.—Lincoln Congress (continued).

FRIDAY, AUGUST 2.

British Archæological Association.—Lincoln Congress (continued).

SATURDAY, AUGUST 3.

British Archæological Association.—Lincoln Congress (continued).

Miscellanea.

Removal of a Glasgow Land-mark.—The old Athenæum buildings, whence the club or society of that name removed to new quarters in St. George's-place, last year, are now in process of demolition, the site being required by the Government for an enlargement of the General Post Office. The "Athenæum," which faced to Ingram-street, and against the rear of which the new General Post Office, George's-square, was built a few years ago, dates back to 1796-98, when it was erected by a company of Glasgow proprietors associated on the tontine principle, under the title of the "New Assembly and Concert Rooms." The site at that time was almost suburban, although now it is in the very heart of the city, and within a step of the Royal Exchange. Its history is intimately connected with the fashionable gatherings of the West of Scotland, during the closing years of last, and the first thirty years of this century, but in the year 1847 it became the home of the "Glasgow Athenæum," a literary, scientific, and educational society of singular usefulness and success, and for fully forty years thereafter remained as such, forming one of the city's secondary centres of progress and culture. The building possessed a frontage which was reckoned handsome and effective;—Grecian in style; and some considerable time after the opening of the present century its value as a street feature was further enhanced by detached wings of corresponding design. The central, or original erection had a rusticated basement story, with a deep square projection from the middle of the front, supporting four Ionic columns with pilasters and entablature. The assembly-room, subsequently the Athenæum news-room and lecture-hall, was 37 ft. in height and measured 80 ft. by 35 ft. After being vacated by the Athenæum the building was from time to time utilised by the Post-office authorities at seasons of business overflow, but it is now to be replaced by an entirely new erection of suitable interior plans, and added permanently to the Post-office block. The facing stones, columns, pilasters, and entablature of the old frontage are being carefully preserved, with a view to partial re-erection and preservation in one of the city parks.

The English Iron Trade.—The English iron market is getting much more active, and its tendency continues upwards. Pig-iron is in better inquiry, and higher prices are the rule. Scotch warrants are still advancing, and have carried up with them the rates quoted for makers' iron, the various brands of which are from 6d. to 1s. 6d. a ton dearer. Producers of Cleveland pig also want 1s. a ton more for their iron, but prompt business has been done in some instances at a rise of 6d. on the week. Bessemer has likewise gained another 6d. In Lancashire and the Midland districts the improvement in prices and demand continues. The demand for finished iron is more active this week, and its value is fully maintained. Steel is also very firm, and there is a large output, with extensive orders held in reserve. Shipbuilding, now that a good many orders have been placed by the Admiralty, is starting on another period of briskness and prosperity. In all departments of engineering there is plenty of work, with more coming forward.—*Iron.*

Strike of Bricklayers in Dublin.—There is a strike of bricklayers in Dublin, fully 600 men being out. The men consider that their wages are insufficient; they desire to be paid at the general rate of 6s. per day.

Chubb & Son's Lock and Safe Company, Limited.—We are informed that the directors have secured an extensive piece of land on the Stafford-road, Wolverhampton, adjoining the Great Western Railway, for the erection of new safe works. These works, making the third now occupied by the Company, will, it is expected, be equipped and in going order by September.

PRICES CURRENT OF MATERIALS.

TIMBER.	£. s. d.	£. s. d.
Greenheart, B.G. ....ton	7 0 0	7 15 0
Teak, E.I. ....load	13 0 0	14 0 0
Sequoia, U.S. ....foot cube	0 2 3	0 3 0
Ash, Canada ....load	3 10 0	5 0 0
Birch ,, ...load	3 10 0	4 0 0
Elm ,, ...load	4 0 0	5 0 0
Fir, Dantzic, &c. ....load	2 0 0	3 10 0
Oak ,, ...load	3 10 0	4 10 0
Canada ,, ...load	5 10 0	7 10 0
Pine, Canada red ....load	3 0 0	4 0 0
,, yellow ....load	3 10 0	5 5 0
Lath, Dantzic ....fathom	4 10 0	5 10 0
St. Petersburg ....log	5 0 0	6 10 0
Wainscot, Riga, &c. ....log	2 15 0	4 5 0
Deals, Finland, 2nd and 1st...std. 100	9 0 0	11 0 0
,, ,, 4th and 3rd....	7 10 0	8 15 0
Riga	7 0 0	9 0 0
St. Petersburg, 1st yellow	11 0 0	15 0 0
,, 2nd ,, ...	10 0 0	11 0 0
,, white	7 0 0	10 10 0
Swedish	9 0 0	16 0 0
White Sea	9 10 0	17 0 0
Canada, Pine, 1st	16 0 0	30 0 0
,, ,, 2nd	11 0 0	17 10 0
,, ,, 3rd, &c.	8 0 0	10 10 0
,, Spruce, 1st	9 10 0	11 0 0
,, ,, 2nd and 3rd	7 0 0	9 0 0
New Brunswick, &c.	6 10 0	8 10 0
Battens, all kinds	6 10 0	10 0 0
Flooring Boards, sq., 1 in., prepared, First	0 11 0	0 14 0
Second	0 8 0	0 10 0
Other qualities	0 5 6	0 7 0
Cedar, Cuba ....foot	0 0 4½	0 0 4½
Honduras, &c.	0 0 4½	0 0 4½
Mahogany, Cuba	0 0 4½	0 0 6
St. Domingo, cargo average	0 0 4½	0 0 6
Mexican ,, ...	0 0 4½	0 0 5½
Tobasco ,, ...	0 0 5½	0 0 6
Honduras ,, ...	0 0 5½	0 0 6
Box, Turkey ....ton	6 0 0	15 0 0
Rose, Rio	15 0 0	20 0 0
Bahia	14 0 0	18 0 0
Satin, St. Domingo ....foot	0 0 6	0 1 0
Porto Rico	0 0 9	0 1 3
Walnut, Italian	0 0 4½	0 0 6½
METALS.		
IRON—Bar, Welsh, in London...ton	5 5 0	5 10 0
,, ,, at works in Wales ...	4 15 0	5 0 0
,, Staffordshire, in London ...	5 10 0	6 10 0
COPPER—		
British, cake and ingot.... ton	46 0 0	0 0 0
Best selected	47 0 0	47 10 0
Sheets, strong	53 10 0	0 0 0
Chili, bars	41 15 0	0 0 0
YELLOW METAL ....lb.	0 0 5	0 0 5½
LEAD—		
Sheet, English	13 10 0	14 0 0
SPELTER—		
Silesian, special ....ton	19 17 6	20 0 0
Ordinary brands	19 12 6	19 17 6
TIN—		
Straits ....ton	90 0 0	0 0 0
Australian	90 0 0	0 0 0
English Ingots	94 0 0	0 0 0
ZINC—English sheet ....ton	21 0 0	22 0 0
OILS.		
Linseed ....ton	20 17 6	21 5 0
Cocoanut, Cochin	26 10 0	27 10 0
Ceylon	23 10 0	24 0 0
Palm, Lagos	24 10 0	25 0 0
Rapeseed, English pale	30 5 0	30 10 0
,, brown	28 10 0	28 15 0
Cottonseed, refined	26 10 0	27 10 0
Tallow and Oleine	21 0 0	40 0 0
Lubricating, U.S.	5 0 0	6 0 0
,, refined	7 0 0	12 0 0
TAR—Stockholm ....barrel	1 3 6	1 4 0
Archangel	0 15 9	0 16 0

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *Noon on Thursdays.*]

BRIGHTON.—For the Sanatorium Laundry, Brighton, for the Corporation, from plans by Mr. G. R. Andrews, C.E., Borough Surveyor:—

J. T. Chappell, Pimlico	£1,995 0 0
G. G. Garbutt, Brighton	1,990 0 0
G. R. Lockyer, Brighton	1,988 0 0
V. P. Freeman, Brighton	1,960 0 0
J. Anscombe, Brighton	1,945 0 0
J. Barnes, Brighton	1,900 0 0
J. J. Wright, Brighton	1,890 0 0
A. Dean, Brighton	1,888 0 0
C. & F. Cheesman, Brighton	1,846 0 0
Bissett & Sons, Birmingham	1,845 0 0
W. H. Sawle, Worthing	1,797 0 0
A. M. Deacon & Co., West Norwood	1,720 0 0
J. Longley & Co., Crawley	1,695 0 0

CROYDON.—For erecting the second portion of contract for business premises, North-end, for Mr. J. Allden. Mr. A. Broad, A.R.I.B.A., 27, Dingwall-road, Croydon, architect. Quantities by the architect:—

Smith & Bulled, Croydon	£424 15 0

[No competition.]

EAST HAM (Essex).—For repairs, &c., to eight cottages, for Mr. G. B. Graburn:—

Burgess & Algar, Bromley-by-Bow*...	£100 0 0

* Accepted.

CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

Nature of Work, or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Waterworks	Faringdon Union R.S.A.	F. H. Barfield, F.S.I.	Aug. 2nd	ii.
Wrought-Iron Girders, &c.	Met. & Met. Dist. Rail. Joint Committee	J. J. Hanbury	do.	ii.
Sanitary Works, &c.	St. George-in-the-East Guardians	Wilson, Son, & Aldwinckle	do.	xii.
Paving, &c.	East Dereham Loc. Bd.	F. W. Skipper	Aug. 6th	ii.
New Roads, Sewerage Works, &c.	Toxteth Park Loc. Bd.	J. Price	Aug. 7th	ii.
Wrought-Iron Gates	Manchester Corp.	G. H. Hill	do.	xii.
Quay Wall	Belfast Corporation	*Official*	Aug. 9th	ii.
Paving Street	Finchley Local Board	do.	Aug. 12th	xii.
Removal of Dust and Refuse, &c.	St. George-the-Martyr (Southwark) Vestry	do.	Aug. 27th	xii.
Private Street Improvements	Bromley Local Board	H. S. Cregeen	Sept. 2nd	ii.
New Road	do.	*Official*	do.	ii.
Stoneware Piping	do.	do.	do.	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
County Surveyor	Notts County Council	500*l.*	Aug. 13th	xvi.
Resident Engineer	Manchester Corp.	450*l.*	Aug. 20th	xvi.
Civil Engineering Draughtsman	Hull Corporation	100*l.*	Not stated.	xvi.
Temporary Clerk of Works	Royal Engin., Sheerness	10s. per diem	do.	xvi.
Temporary Foreman of Works	do.	6s. ,,	do.	xvi.

EDMONTON.—For alterations and additions at the Strand Union Schools, Millfield House, Edmonton, for the Guardians of the Strand Union. Mr. W. S. Cross, architect. Quantities by Mr. H. E. Pollard :—

Patman & Fotheringham	£11,740 0 0
Brass & Son	11,627 0 0
Hall & Biddell	11,367 0 0
Macey	11,220 0 0
Clemence	10,975 0 0
D. Laing	10,662 0 0
Hart Bros.	10,553 0 0
Holliday & Co.	10,333 0 0
Patrick & Son	10,270 0 0
Holloway	10,062 0 0
C. Darrell	9,763 0 0
C. Wall	9,198 0 0

HORNSEY.—For new road, sewer, surface-water drain, connexions, &c., for the British Land Company, on their estate at Harringay Park. Mr. Henry B. Michell, surveyor :—

Pell & Sons	£1,340 0 0
Wilson	1,321 10 0
Dunmore	1,300 0 0
Nowell & Robson	1,255 0 0
Killingback	1,250 0 0
Bloomfield	1,222 0 0
Pizzey (accepted)	1,200 0 0

LONDON.—For the erection of new business premises, Southwark, S.E., for Messrs. Alfred Higgitt & Co. Mr Chas. J. C. Pawley, architect, 2, Prince's Mansions, Victoria-street, Westminster :—

W. Goodwin, Hatton-garden, E.C.	£3,885 0 0
F. Dawes, Peckham, S.E.	3,750 0 0
Turtle & Appleton, Wandsworth, S.W.	3,645 0 0
Ward & Co., Peckham, S.E.	3,639 0 0
H. Piper, New Cross, S.E.	3,595 0 0

LONDON. — For the erection of stabling, shed, cottage, &c., for the London General Omnibus Company, Limited, at Fernhead-road, Harrow-road, N.W., under the superintendence of Mr. G. T. Lanham. Quantities by Mr. A. J. Bolton :—

Turtle & Appleton	£1,978 0 0
Stephenson	1,954 0 0
Knight	1,690 0 0
Evans	1,679 0 0
Britton	1,678 0 0
R. & E. Evans	1,667 0 0
Geo. Parker	1,620 0 0
Garrad	1,617 0 0
Toms	1,554 0 0
Hunt	1,526 0 0
Haynes	1,510 0 0

LONDON.—For the erection of additional story on stables for the London General Omnibus Company (Limited), at Windsor Castle-yard, Hammersmith, under the superintendence of Mr. G. T. Lanham. Quantities by Mr. A. J. Bolton :—

Harris & Wardrop	£1,970 0 0
Haynes	1,908 0 0
Garrad	1,727 0 0
Evans	1,695 0 0
Knight	1,683 0 0
Parker	1,655 0 0
Britton	1,631 0 0
R. & E. Evans	1,598 0 0
Hunt	1,545 0 0
Toms	1,524 0 0
Stephenson	1,455 0 0

LONDON.—For remodelling bar, cabinet, new saloon bar, counters, pewtering, and decorations at the "Favourite" tavern, Hornsey-rise, N., for Mr. A. Hutchinson. Messrs. G. Carter & Son, surveyors, 541, Holloway-road, N. :—

Cattle (accepted)	£350 0 0

LONDON.—For repairs, decorations, and alterations at the "Lord Nelson" tavern, Copenhagen-street, N., for Messrs. Patrick and Manning. Messrs. G. Carter & Son, surveyors, 541, Holloway-road, N. :—

Kitchener (accepted)	£141 0 0

New Counter, Beer-Engines, Pewtering, &c.

Sanders & Son, Oxford-street (accepted)	£125 0 0

LONDON.—For erecting Colet House Preparatory School, West Kensington. Mr. W. H. Spaull, architect. Quantities by Mr. J. Gandy :—

Dove Bros.	£16,915 0 0
Patman & Fotheringham	16,470 0 0
Holland & Hannen	15,990 0 0
Jno. Mowlem & Co.	15,676 0 0
Brass & Co.	15,673 0 0
D. Charteris	15,597 0 0
Perry & Co.	14,998 0 0
Kirk & Randall	14,617 0 0
Stephens, Bastow, & Co. (accepted)	14,499 0 0

LONDON.—For superstructure of premises in Throgmorton-avenue, for Mr. John Morris, on land belonging to the Carpenters' Company, and for Mr. Geo. Fleming, on land belonging to the Drapers' Company. Messrs. Davis & Emanuel, architects. Quantities by Mr. W. Matthews :—

	A*	B†	Total.
Cubitt & Co.	£11,850	£11,260	£23,110
Mowlem & Co.	11,816	11,160	22,976
Ashby & Horner	11,800	11,080	23,580
Trollope & Sons	11,491	10,980	22,471
J. T. Chappell	11,235	10,732	21,967
Colls & Sons	10,998	10,578	21,576

* Building on the Carpenters' Company's land.
† Building on the Drapers' Company's land.

LONDON.—For the erection of new police-station at Norwood-green, for the Receiver for the Metropolitan Police District. Mr. John Butler, Surveyor to the Metropolitan Police :—

Lodge	£3,310 0 0
Hart	2,990 0 0
Avins	2,989 0 0
Scrivener & Co.	2,937 0 0
Ansell	2,888 0 0
Brass & Sons	2,880 0 0
Holland & Hannen	2,855 0 0
Perkins	2,853 0 0
Grover & Sons	2,850 0 0
Chappell	2,849 0 0
Lorden & Sons	2,787 0 0
Lathey Bros.	2,700 0 0
A. & B. Hanson	2,688 0 0
Fassnidge (accepted)	2,647 0 0

LONDON.—For alteration of dispensary and the erection of residence for the Medical Officer at the infirmary of the Whitechapel Union, for the Guardians. Mr. Bruce J. Capell, architect. Quantities supplied :—

Ward & Co.	£2,578 0 0
Catmer	2,465 0 0
Wood	2,259 0 0
Hockley	2,206 0 0
Gregar	2,194 0 0
J. O. Richardson	2,108 0 0
Edwards	2,053 0 0
Hunt	1,983 0 0
Duggan	1,842 0 0
Lob & Oliver	1,764 0 0

LONDON.—For the enlargement of Plaistow-road Board School, for the School Board for London. Mr. T. J. Bailey, architect :—

Parkes	£1,449 0 0
Tyerman	1,383 0 0
Goodman	1,369 0 0
Longley & Co.	1,339 0 0
Wm. Downs	1,337 10 0
Staines & Son	1,289 0 0
Knight	1,287 1 0
Kirk & Randall	1,222 0 0
J. O. Richardson	1,204 0 0
Charteris	1,197 0 0

LONDON.—For the enlargement of Gravel-lane Board School, for the School Board for London. Mr. T. J. Bailey, architect. Quantities by Messrs. Arding, Bond, & Buzzard :—

Parker	£1,250 0 0
Longley & Co.	1,241 0 0
Wm. Downs	1,190 0 0
Goodman	1,144 0 0
Williams	1,123 0 0
Charteris	1,100 0 0
Holloway	1,070 0 0
J. O. Richardson	1,029 0 0

LONDON.—For new staircase at the Norwood Schools for the Lambeth Board of Guardians. Quantities by Messrs. Fowler & Rugman :—

Hall, Beddall & Co.	£260 0 0
F. & H. F. Higgs	249 0 0
B. E. Nightingale	243 0 0
W. Lye	236 11 4
A. & W. Garner	230 0 0
A. W. Deacon & Co.	225 0 0
J. O. Richardson	219 0 0

LONDON.—For rebuilding No. 18, Langham-street, Portland-place, W., for Mr. L. W. Thomas. Mr. C. H. Worley, architect. Quantities by Mr. R. C. Glead :—

Colls & Sons	£3,795 0 0
Holliday & Greenwood	3,612 0 0
Stevens	3,506 0 0
Lawrance & Sons	3,493 0 0
W. Downs	3,354 0 0
Bridgell	3,305 0 0
Green & Lee	3,348 0 0

LONDON.—For erecting stabling in Vauxhall-walk, for Messrs. H. Myer & Co. Mr. John A. J. Woodward, architect, 10, Crown-villas, Kennington Oval :—

Nightingale	£791 0 0
Ansell	777 0 0
Hooper	730 0 0
Ford	720 0 0
Marsland	685 0 0
Tyerman	680 0 0
J. Beale, Westminster Bridge-road	660 0 0

LONDON.—For alterations to two houses, No. 210 and 213, East India-road, for Mr. Philip Leiben. Mr. Clarkson, architect, Poplar :—

Higgs	£767 0 0
Holland	500 0 0
Walker	497 0 0
King	486 0 0
Hearle	483 0 0
Trigge, Prescot-street	448 0 0
Linn	400 0 0
Dames	390 0 0

LONDON.—For erecting two new class-rooms, seven new water-closets, and other works, in connection with Holy Trinity Schools, Carlisle-place, Lambeth, for the Rev. G. Weigall, M.A. Mr. Thos. Seward, architect, 35, Benhill-road, S.E. :—

W. Downs	£640 0 0
Lorden	569 0 0
Lapthorne	557 0 0
Hills & Sills	538 0 0
J. Beale, Westminster Bridge-road*	471 0 0

* Accepted.

LONDON.—For erecting new armoury and officers' room at the Headquarters of the 2nd Tower Hamlets R.V. Mr. Theodore Moore, architect, 144, Mile-end-road, E. :—

Little & Senecal	£315 0 0
Trigge (accepted)	279 0 0

LONDON.—For re-building two cottages, Eagle-place, Mile-end. Mr. Theodore Moore, architect, 144, Mile-end-road :—

Leatherdale	£180 0 0
Lusk (accepted)	165 0 0

LONDON.—For alteration and additions to the "Royal George" public-house, Charing-cross-road, for Messrs. H. Richardson & Co. Mr. J. T. Alexander, architect, 40, Great James-street, Bedford-row, W.C. :—

Wilkinson	£3,233 0 0
Maddock Bros.	3,195 0 0
Chappel	3,186 0 0
J. L. Green	3,089 0 0
Patman & Fotheringham	3,073 0 0
J. Beale, Westminster Bridge-road	2,794 0 0

LONDON.—For alterations to the "Old Bell" public-house, High-road, Kilburn, for Mr. S. Shapcott. Mr. J. T. Alexander, architect, 40, Great James-street, Bedford-row :—

Marks	£573 0 0
J. Beale	490 0 0
Aldrey	467 0 0
Higgs	310 0 0

LONDON.—For alterations and repairs to the "Masons Arms" Hotel, Harrow-road, for Mr. Lander. Messrs. Treacher & Fisher, architects, 30, Coleman-street, E.C. :—

Marks	£1,117 0 0
Allen	1,111 0 0
J. Beale	963 0 0
Walker	945 0 0
Spencer & Co.	930 0 0
Turtle & Appleton	913 0 0

LONDON.—For alterations to the "Rising Sun" public-house, York-road, Lambeth, for Mr. George Gabb. Mr. Geo. Treacher, architect, 30, Coleman-street, E.C. :—

Ansell	£790 0 0
Jennings	780 0 0
Munday	714 0 0
Creaker	673 0 0
J. Beale	636 0 0
Spencer & Co.	630 0 0
Turtle & Appleton	645 0 0

LONDON.—For new choir vestry to St. Mary's Church, Kilburn. Messrs. Francis & Sons, architects, Palmerston-buildings, E.C. :—

F. Austey	£133 10 0
Wiggins & Head	327 0 0
S. Dainton	310 0 0
J. Allen & Sons	296 0 0
Colls & Sons	282 0 0
R. A. Yerbury, St. Margaret's, Kilburn (accepted)	244 0 0

LONDON.—For sundry repairs, &c., to Lady Holles' Girl School, Mare-street, Hackney. Mr. F. Hammond, architect, 1, Circus-place, London-wall :—

Larke & Son (accepted)	£165 0 0

LONDON.—For bar-fittings, &c., at the "Hope and Anchor" public-house, Brixton, under the superintendence of Mr. W. Eve, F.S.I., 10, Union-court, E.C. :—

Sanders & Son	£434 5 0
Lascelles	390 0 0
Chappell (accepted)	329 0 0

LONDON.—For rebuilding premises in rear of Nos. 55, 56, and 57, Red Cross-street, City. Mr. F. Hammond, architect, 1, Circus-place, London-wall:—

Hosegood	£4,325 0 0
Dove Bros.	3,975 0 0
Lawrence & Son	3,820 0 0
Brass & Son (accepted)	3,778 0 0

LONDON.—For proposed rebuilding of No. 29, Hertford-street, Mayfair, W., for Mr. G. H. Haines. Messrs. Haines & Darling, architects. Quantities by Mr. F. Hingston:—

	Extra for Portland stone.	Plumber estimate separate.	Credits.
Colls & Sons	£4,602	£586	£40
Holland & Hannen	4,084	542	20
Grover	4 575	516	—
Hall, Beddall, & Co.	4,374	494	20
Peto Bros.	4,960	509	—
Higgs & Hill	3,830	499	35
Stephens, Bastow, & Co.	3,777	483	37
Kinman & Sons	3,672	475	20

LONDON.—For repairs, &c., to the "King's Arms" public-house, St. George's-road, Southwark, for Mr. Fred Eade:—

J. Beale, Westminster-bridge-road*	£290 0 0

* Accepted. [No competition.]

LONDON.—For sinking and building brick tan-pits and drainage works, for Messrs. Edwin Ellis & Co., Horney-lane, Bermondsey, S E.:—

Brown, Bromley	£618 6 0
Wells, Bermondsey	485 0 0
Stanley Ellis, Guildford (accepted)	430 0 0

MANCHESTER.—For four houses at Stand, for the Misses Farrar. Mr. J. D. Harker, architect, 78, King-street, Manchester:—

John Jackson & Sons, Whitefield*	£2,280 0 0

* Accepted.

PLUMSTEAD.—For alterations to Brewery Stores, Plumstead, for Messrs. Mitchell & Beasley. Messrs. Isaksipp & Mackenzie, architects:—

Strickland & Chandler	£725 0 0
J. O. Richardson	551 0 0
Kirk & Randall (accepted)	527 0 0

SOUTHAMPTON.—For erecting head-quarters for the Gordon Boys' Messenger Brigade, Ogle-road, Southampton. Mr. W. H. Mitchell, architect:—

Brinson & Sons	£1,135 0 0
Chapman	1,045 0 0
H. Stevens & Co.	975 0 0
Bull & Sons	965 0 0
Jonas Nichols (accepted)	920 0 0

SWINDON.—For proposed Public Offices, Swindon, for the Swindon New Town Local Board:—

Edmund Chambers, Swindon	£10,246 9 6
D. C. Jones & Co., Gloucester	9,279 0 0
A. Kranse, Bristol	9,217 0 0
G. Wiltshire, Swindon	9,031 0 0
J. Barrett, Swindon	8,803 0 0
W. Jones, Gloucester	8,680 0 0
Stephens, Bastow, & Co., Bristol and London	8,495 0 0
G. Grimwood & Sons, Sudbury	8,490 0 0
T. Martin, Maidenhead	8,166 0 0
J. Reed, Plymouth	8,113 11 3

Bull Inn, Tottenham.—One of the firms tendering writes to say that there *was* a competition for this job, and that there were four other tenders besides Mr. F. Blandford's, which was stated to have been accepted.

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